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PERCEPCIÓN DE LOS USUARIOS INDIVIDUALES DE LOS SERVICIOS DE INTERNET Y TELEFONÍA MÓVIL EN ESPAÑA Y EL REINO UNIDO

MEMORIA PARA OPTAR AL GRADO DE DOCTORA

PRESENTADA POR

María Covadonga Gijón Tascón

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A mi atípico favorito

To my favorite outlier

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Resumen

Las telecomunicaciones son un tema de máxima actualidad, aunque en realidad lleva entre nosotros desde casi los inicios de la humanidad. Desde el principio de los tiempos hemos necesitado comunicarnos. Primero se hizo con la invención de signos para las comunicaciones cara a cara. Más adelante, con la dispersión de los pueblos, surge la necesidad de comunicarse a distancia. Las primeras comunicaciones de la historia fueron las señales de humo; los pueblos primitivos, por ejemplo, se comunicaban a través de ellas. Mucho más tarde llegaría Bell y la invención del teléfono. El uso masivo de las comunicaciones comenzó, como casi todo en este mundo, de la mano del entorno militar. Así, la capacidad de poder comunicar cualquier orden militar o política de forma casi instantánea ha sido fundamental en muchos acontecimientos históricos de la Edad Contemporánea. A modo de ejemplo, el primer sistema de telecomunicaciones moderno aparece durante la Revolución Francesa. Además, la telecomunicación constituye hoy en día un factor social y económico de gran relevancia, gracias a la generalización de la electricidad y la electrónica, hemos llegado a lo que hoy entendemos por telecomunicaciones: telefonía (fija y móvil), Internet (también fijo y móvil), dispositivos móviles, teléfonos inteligentes, tabletas, ordenadores de sobremesa, ordenadores portátiles, notebooks, etc.

Así vamos viendo cómo algo considerado como moderno y actual, no es más que la evolución de las señales de humo de hace tiempo. Al igual que evolucionan las carreteras y caminos, o las comunicaciones

terrestres, aéreas y marítimas, las telecomunicaciones también lo han hecho.

Y como todos los servicios que nos rodean, no siempre estamos satisfechos con ellos. Alguna vez hemos podido tener algún problema o precisar de ayuda sobre algún tema en concreto.

Es por ello que esta tesis se centra en sus dos primeros capítulos en la satisfacción y en las quejas de los usuarios de telefonía móvil e internet en España.

Del mismo modo, el uso que se hace de Internet también ha evolucionado y hay usuarios que compran bienes o contratan servicios en línea, pudiendo ceder su información personal para realizar la compra o contratación.

Una información personal que algunas empresas venden a otras o se utilizan para conocer mejor al usuario, sus preferencias, y gustos, mediante estudios de mercado, comportamiento, etc., pero ¿el usuario está dispuesto a pagar y obtener algún tipo de compensación a cambio de la cesión o no de sus datos? ¿Es consciente de la cesión de su información personal? Este es el tema que nos ocupa en el último capítulo de este trabajo.

La satisfacción del consumidor es un factor determinante en la retención de clientes, la rentabilidad de los operadores, el bienestar del consumidor y una variable estratégica para la competencia y las comparaciones internacionales. Aunque parezca contradictorio por esta

afirmación, la satisfacción del cliente de telefonía móvil en España es la más baja de la Unión Europea, y es posible que no se cuide suficientemente este aspecto.

El objetivo del primer capítulo es identificar los factores determinantes de la satisfacción de los usuarios residenciales de telefonía móvil entre los consumidores privados de las telecomunicaciones móviles en España. Dos aspectos innovadores de este capítulo son el foco sobre una muestra representativa a nivel nacional de los consumidores residenciales en España, y el uso de una amplia muestra de datos individuales, para recoger información estadística de alta calidad. Se especifican los modelos econométricos y estiman mediante una encuesta hecha a 4.249 usuarios de telefonía móvil. Se mide la correlación de cada uno de los aspectos de la satisfacción general. Además, se formulan las relaciones entre los diferentes aspectos de la satisfacción y sus determinantes.

Los resultados indican que los clientes están menos satisfechos con las compañías grandes, y más satisfechos con los operadores más pequeños y más nuevos. En esta línea, se sugieren recomendaciones en las políticas para mejorar la satisfacción del cliente, contribuir a la retención de los mismos y mejorar la posición del país en los rankings internacionales.

Las quejas de los consumidores son numerosas, según las estadísticas oficiales. Por otro lado, las quejas influyen en la satisfacción y la retención del cliente. En el segundo capítulo se analizarán los determinantes de los diferentes tipos de quejas presentadas por los

consumidores residenciales en España, utilizando la encuesta del CIS y el informe del Ministerio de Industria. La primera encuesta utiliza la información desglosada sobre 4.249 consumidores residenciales, mientras que en el informe se resumen las denuncias recibidas por el Ministerio en la Oficina de Servicio de Atención al Cliente de Telecomunicaciones del Ministerio de Industria. Se especifican y estiman modelos econométricos para cuantificar las relaciones, y con los resultados se caracterizarán los perfiles de los que se quejan, así como la posible distinción entre quejas según ingresos, edad o educación. Por último, se proponen recomendaciones de política para mejorar la satisfacción del cliente y disminuir las razones para presentar quejas.

En el capítulo 3 se propone la aplicación de un enfoque ampliamente utilizado, conocido como experimentos de elección discreta con preferencia declarada (stated-preference-discrete-choice-experiment), para estimar el valor de la información personal en tres contextos y situaciones de la vida real.

Se desarrollan tres experimentos que describen situaciones hipotéticas en las que los encuestados consideran que varían los aspectos de su información personal (por ejemplo el almacenamiento de los datos y la forma en que se comparte con terceros) cuando (a) se compra un producto a través de Internet, (b) cuando se compra un servicio o (c) se realiza una búsqueda.

La encuesta se llevó a cabo con muestras de sujetos pre-establecidas, a fin de que coincidieran con el perfil de la población de usuarios de

Internet en el Reino Unido en aspectos relativos a género, grupo de edad, zona geográfica de residencia y el ingreso anual individual. Los resultados del experimento proporcionan nuevos conocimientos en el valor y en la influencia de los atributos de la información personal cuando se realizan transacciones en línea.

En particular, los principales resultados muestran que hubo poco interés por parte de los encuestados en tener un control de sus datos personales, a cambio de pagar por ello. Además, que el concepto de compartir información personal con terceros fue el aspecto más importante en el momento de elegir a los vendedores (minoristas) en línea y seleccionar motores de búsqueda. A eso podemos sumar que una duración no especificada del almacenamiento de los datos se recibió tan mal como el almacenamiento de datos más allá de varios años por parte de los minoristas en línea y peor, también, que una duración más corta.

Conscientes de que existe la limitación temporal de los datos, se espera poder realizar una encuesta para 2014/2015 en la que se incluyan nuevos factores a tener en cuenta en cuestiones relativas a satisfacción, quejas y protección del consumidor para telefonía fija, móvil e Internet (fijo y móvil), así como ampliar el ámbito nacional a un ámbito europeo, para poder hacer comparaciones internacionales.

Además, con respecto al último capítulo, se quiere seguir analizando los datos incluyendo además variables socio-demográficas, preguntas sobre privacidad en el mundo real (no sólo online) y hacer un perfil de

usuario. Y, asimismo, ampliar el estudio al ámbito europeo y poder proteger al consumidor online de productos y servicios.

Abstract

Telecommunications is a very contemporary and modern subject, but in fact it is around since almost the beginning of mankind. From the beginning of time, we need to communicate. First with the invention of signs for face-to-face communications. Later, with the dispersion of the people, the need to communicate remotely arises. Primitive peoples, for example, communicated through smoke signals. Much later came Bell and the invention of the telephone. The massive use of communication began, like many things, in the military environment. Thus, the ability to communicate military or political orders almost instantaneously was crucial in many historical events of the modern age. For example, the first modern telecommunications system appears during the French Revolution. In addition, telecommunications today is a social and economic factor of great importance, thanks to the wide spread availability of electricity, electronics and telecommunications: telephone (fixed and mobile), Internet (fixed and mobile), smartphones, tablets, desktops, laptops, notebooks, etc.

And as with all the services that surround us, we are not always pleased with them. Sometimes we have problems or require help on a particular subject.

That is why the first two chapters of this thesis focus on the satisfaction and complaints from mobile phone users and internet in Spain.

Similarly, the use of the Internet has also evolved. We nowadays buy goods or services on line. Usually your personal information to carry out the purchase or rental is required.

Some companies sell personal information to other companies. Or it is used to better understand the consumers and their preferences, and tastes. through market research. Here we investigate whether the user is willing to pay and/or get some compensation in exchange for the transfer of their data. Is the consumer aware of the transfer of their personal information? These are the issues we consider in the last chapter of this work.

Consumer satisfaction is a determinant factor in customer retention, profitability of operators, consumer welfare and a strategic variable for competition and international comparisons. Customer satisfaction of mobile phone users in Spain is the lowest in the European Union in the last few years.

The objective of the first chapter of this dissertation is to identify the determinants of satisfaction among mobile phone users in Spain. Two innovative aspects of this chapter are the focus on a nationally representative sample of residential consumers in Spain, and the use of rich individual data that convey high-quality statistical information. The relationships between different aspects of satisfaction and its determinants are formulated. Econometric models are specified and estimated using a CIS survey of 4,249 mobile phone users.

The results indicate that customers are less satisfied with larger companies, and are more satisfied with smaller and newer operators. In the same vein, policy recommendations are suggested to improve customer satisfaction, contributing to customer retention and improving the country's position in international rankings.

The consumer complaints are numerous, according to official statistics. In turn, complaints influence satisfaction and customer retention. In the second chapter, the determinants of different types of complaints made by residential consumers in Spain are analyzed using the CIS survey and the report of the Ministry of Industry. The first survey uses disaggregated data on 4,249 residential consumers, while the report of complaints received by the Office of Telecommunications Customer Service of the Ministry of Industry is summarized. Econometric models are specified and estimated to quantify relationships, and the results, the profiles of the complainers and the possible relationship between complaints and income, age or education will be characterized. Finally, policy recommendations are proposed to improve customer satisfaction and reduce the reasons for complaints.

In chapter 3 the application of a widely used approach is proposed, known as stated-preference-discrete-choice-experiment, to estimate the value of personal information in three contexts of real life.

Three experiments describing scenarios in which respondents consider varying aspects of their personal information (eg. storage and sharing

with others) when (a) the purchase of a product line are developed, (b) service, or (c) the performance of online search.

The survey was conducted using contributions from the pre-specified sample to match the population profile of Internet users in the United Kingdom in terms of gender, age group, geographical area of residence and personal annual income. The experimental results provide new insights into the value and impact of the attributes of personal information when transacting online. In particular, the main results show that there was little interest on the part of respondents to keep control of their personal data in exchange for even a small payment. Furthermore, the extent of sharing personal information with third parties was the most important when choosing vendors (retailers) and online search engines look, and unspecified duration of data storage, was received as bad as storing data across several years for online retailers and worse than a shorter duration.

Being aware that there is a time limitation of the data, we expect to conduct a new survey in 2014-2015 in which new factors are considered including issues of satisfaction, complaints and consumer protection for fixed, mobile and Internet (fixed and mobile) as well as to expand the survey to a European level, in order to make international comparisons .

Moreover, it is intended to further analyze the data including socio-demographic variables, questions about privacy in the real world (not just online) and make a user profile. And, to extend the study to a European level and to protect online consumers of products and services.

Capítulo 1 – Chapter 1: Satisfaction of individual mobile phone users in Spain[1]

Abstract

Consumer satisfaction is a key determinant of consumer retention, consumer welfare, and is also a strategic variable for competition and international comparisons. Spain's mobile customer satisfaction is the lowest in the European Union. The focus of this paper is to identify the determinants of residential mobile phone users' satisfaction among private consumers of mobile telecommunications in Spain. Two innovative aspects of this paper are the focus on a nationwide representative sample of residential consumers in Spain, and the usage of rich individual data to convey high quality statistical information. The correlation of each of the aspects to the overall satisfaction are measured. Also, relationships between different aspects of satisfaction and its determinants are formulated. The paper specifies econometric models and estimates them using a survey of 4,249 mobile phone users. The results indicate that customers are less satisfied with larger carriers, and are more satisfied with smaller and newer operators. Policy recommendations are suggested to improve customer satisfaction, contribute to customer retention and improve the position of the country in the international rankings.

[1] Published in Telecommunications Policy, 37(10), 940-954; with Garín-Muñoz, T., Pérez-Amaral, T.; & López-Zorzano, R.

Resumen

La satisfacción del consumidor es un factor determinante de la retención de los consumidores, el bienestar del consumidor, y también es una variable estratégica para la competencia y las comparaciones internacionales. Satisfacción del cliente móvil de España es la más baja de la Unión Europea. El objetivo de este trabajo es identificar los determinantes de la satisfacción de los usuarios residenciales de telefonía móvil entre los consumidores privados de las telecomunicaciones móviles en España. Dos aspectos innovadores de este trabajo son el foco de una muestra representativa a nivel nacional de los consumidores residenciales en España, y el uso de los ricos datos individuales para transmitir información estadística de alta calidad. Se mide la correlación de cada uno de los aspectos de la satisfacción general. Además, se formulan las relaciones entre los diferentes aspectos de la satisfacción y sus determinantes. El documento especifica los modelos econométricos y les estima mediante una encuesta de 4.249 usuarios de telefonía móvil. Los resultados indican que los clientes están menos satisfechos con las compañías más grandes, y están más satisfechos con los operadores más pequeños y más nuevos. Se sugieren recomendaciones de política para mejorar la satisfacción del cliente, contribuir a la retención de clientes y mejorar la posición del país en los rankings internacionales.

1. Introduction

The liberalization and re-regulation of telecommunications since the 1980s has been regarded as successful in many accounts. The main focus has been to regulate the relationships between competing firms, between regulators and firms, and between the regulators themselves.

The explicit aim of these regulations was to improve the welfare of customers, both individuals and firms. However customer complaints are abundant, especially about mobile telecommunications services (Vidales, 2012). In 2012, Spain's Office of Telecommunications Users reported 29,720 complaints, 50.8% of them related to mobile telephony (Ministerio de Industria, 2013), while in 2011 they reported 32,448 complaints. The apparent decrease is due to the exclusion in 2012 of the Office's system of complaints for all small and medium enterprises, due to a saturation of services.

Spanish mobile telecommunications consumer satisfaction is the lowest in the whole European Union (SMREC, 2012, p. 195), at a considerable distance from Bulgaria, which was the next-to-last country; see figure 1.1. Moreover, this market was the second worst in the ranking of 51 Spanish markets, according to SMREC, (2013). The

satisfaction has dropped significantly by 11.4 points from 2010 to 2011. This may be a statistical anomaly; although the economic crisis might explain part of this effect, a satisfactory explanation is yet to be found. A sequel to this project using new survey data will focus on the analysis of this issue.

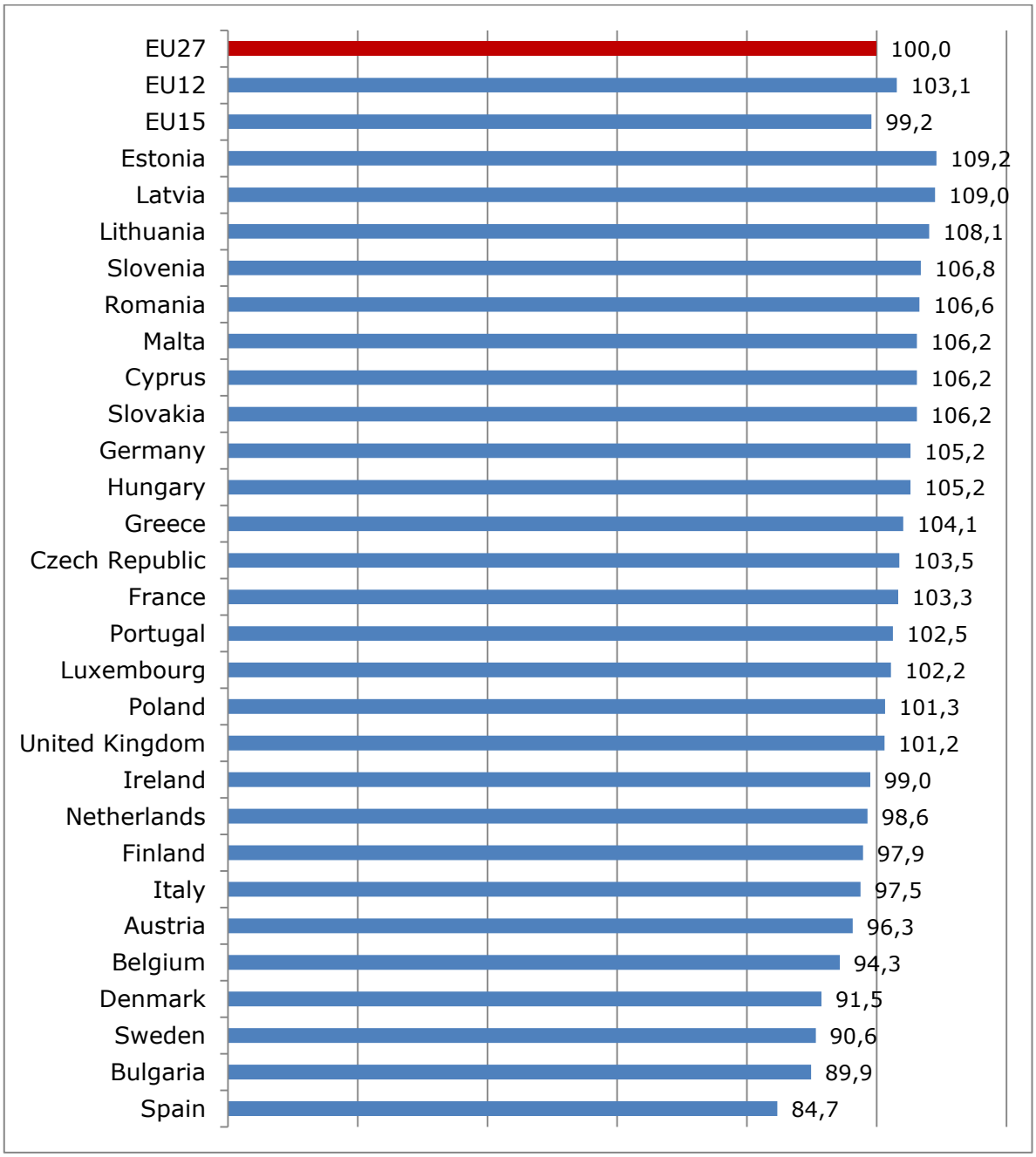
The fact that Spanish users show the lowest satisfaction throughout Europe is a problem. It may signal a low degree of competition in the market and/or more inefficient operators. This finding is significant not only because consumers and other sectors of the economy that use telecoms as an input are hurt, but also because this may imply distrust in the operators and lead to a retardation in the uptake of new services such as 4G. A well-developed and efficient mobile telecommunications sector may be a positive factor for the development of other economic sectors as well as for economic growth.

Since mobile telecommunications markets are now mature, it may be time to focus directly on the relationships between firms and customers. This paper analyzes the satisfaction of private individual consumers of mobile telecommunications in Spain and the factors associated with it.

Given that satisfaction is related to quality, it should be defined before studying consumer satisfaction. Quality has many different definitions and not one is universally accepted (Hardie and Walsh, 1994). Service quality is defined in Parasuraman, Zeithaml, and Berry (1985) as the discrepancy between a customer's expectation of a service and the customer's perception of the service offerings.

Few studies have been found with a focus on individual consumers in Spain. Related studies include CIS (2009) that uses the same data as this paper. It includes detailed descriptive statistics of the data, but no conclusions or policy recommendations, which are out of the scope of that report. Worth mentioning is also Ministerio de Industria (2013), which is a regulator of telecoms in Spain, and where user complaints are dealt with. This report contains only the basic statistics, like percentages, of the sample. It only sometimes distinguishes by operators and does not offer any conclusions. A recent survey on the satisfaction of business customers was conducted by the Comisión del Mercado de las Telecomunicaciones, CMT, (2011). It provided relevant analysis pointing to the heterogeneity within business customers, and between business and residential customers, but did not reach conclusions comparable to those of the present study.

Figure 1.1. Satisfaction with mobile telephone services – normalized MPI by country (SMREC, 2012)



Recently, a series of empirical works analyzing consumer satisfaction, its determinants and its consequences, in the mobile telecommunications industry, were conducted in several countries. These studies can be

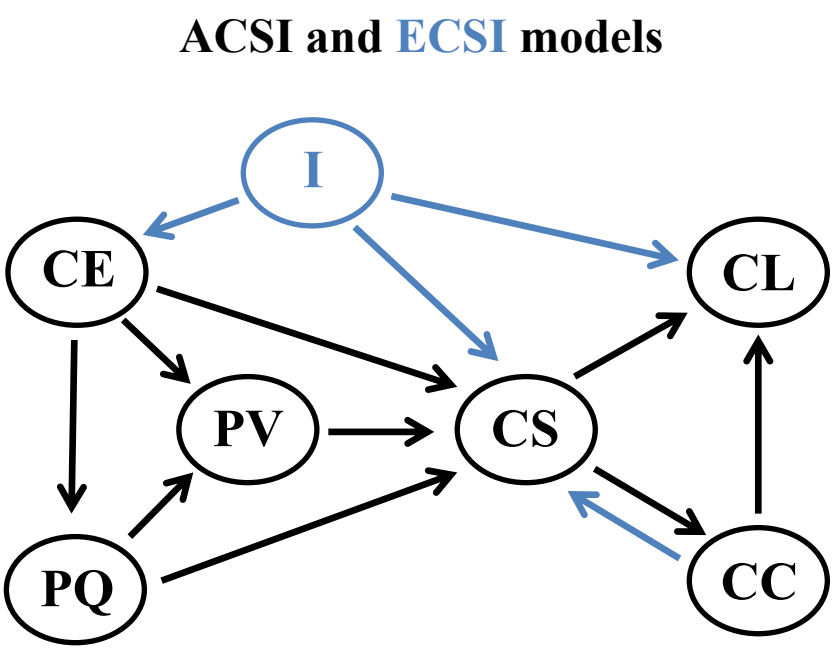
divided into two categories: Confirmatory studies, which use data to test causal relationships in a particular theoretical model; and exploratory studies, which use data to infer causal relations. Since most confirmatory studies test the American Customer Satisfaction Index model (ACSI) or some of its variations/adaptations like the European Customer Satisfaction Index model (ECSI,) below is a brief look at these two models.

1.1. The ACSI and ECSI models

As is shown in figure 1.2, the basic ACSI model (Fornell, Johnson, Anderson, Cha, & Bryant, 1996) posits that overall Consumer Satisfaction (CS) has three antecedents: Perceived Quality (PQ), Perceived Value (PV), and Customer Expectations (CE); and two consequences: Customer Complaints (CC) and Customer Loyalty (CL). PQ is the consumer's evaluation of the consumption experience and PV evaluates perceived quality relative to price. Both these two variables are expected to have a positive effect on overall satisfaction. CE is both backward and forward looking: it captures a consumer's prior consumption experience with the firm's product, and a prediction for its quality in the future. CE is expected to have a positive effect on CS and, because of rational expectations, on PQ and PV as well. The two consequences of the model

are inspired in the exit-voice theory (Hirschman, 1970): when dissatisfied, a consumer may either quit buying (exit), or file a complaint (voice) in order to get some retribution. Therefore, an increase in overall satisfaction should increase CL and decrease CC. The final relation of the model, between CC and CL, reflects the ability of the firm for managing complaints: "When the relationship is positive, the implication is that the firm is successful in turning complaining customers into loyal customers.

Figure 1.2. ACSI and ECSI models



When negative, the firm's complaint handling has managed to make a bad situation even worse."

All of the variables in the ACSI model (CS, its consequences and precedents) are latent constructs that are obtained by operating survey questions (see Fornell et al. 1996).

The basic ECSI model (Eklöf, 2000), retains the basic structure of the ACSI model but incorporates Image (I) as a precedent (see figure 1.2): According to consumer behavior and cognitive psychology theory, corporate image affects a consumer´s perception and therefore it is a driver of CE, CS and CL. The ECSI model also challenges CC as a consequence for CS: although complaints are originated by dissatisfaction, complaint management and complaint resolution are opportunities to increase consumer satisfaction and therefore CC is also a driver of CS. Early versions of the ECSI model, considered complaint handling more important than complaints per se, and therefore CC was treated as a driver instead of a consequence of CS. Some recent versions of the ECSI model posit reciprocal causation between CC and CS (see Johnson et al., 2001 for an excellent discussion on the relation between CC and CS in satisfaction indexes).

The following are some relevant studies that have been conducted for the mobile telecommunications industries of certain countries to either

test these models (confirmatory studies) or to explore and determine the main causes of consumer satisfaction (exploratory studies).

1.2. Confirmatory Studies

Turel and Serenko (2006) use an adaptation of the ACSI model for Canadian wireless carriers and compare it with indices of other industries in the USA. They find that PQ and PV are the principal factors affecting CS in the Canadian mobile phone industry, and that CS is the key determinant of CL. They also conclude that the satisfaction score of young adults with mobile services in Canada is comparable to the score of the same population in the USA, but is lower than those of cable companies and satellite TV providers in the USA.

Martensen, Gronholdt, and Kristensen (2000) use an adaptation of the ECSI model for eight industries in Denmark, including mobile telecommunications. Comparing among industries, they find that long-established competitive markets get higher CS and CL scores than new competitive markets, and the lowest scores are achieved by previous monopoly markets (e.g. mobile telecommunications). For mobile phone services they find that, irrespectively of the carrier, the main drivers for

CS are, in decreasing order, Image, Product and Service. These factors also constitute the main drivers for CL but the order of importance varies between companies: Tele Denmark (Product, Image, Service); Sonofon and others (Image, Service, Product).

Vranakis, Chatzoglou, and Mpaloukas (2012) use a slight variation of the ECSI model to study factors affecting CS and CL for the mobile phone services in Greece. They find that CS is the main driver for CL and that Image is the most important factor affecting CS and CL. They also find that customers do not care too much about technical factors such as signal Quality and Network Coverage.

1.3. Exploratory studies

Most exploratory studies use Structural Equation Modeling (SEM) to determine the main drivers of CS or Consumer Loyalty (CL).

Gerpott, Rams, and Schindler (2001) study causal links between CS, CL and Customer Retention (CR) for the mobile phone industry in Germany. They find that CS has a significant impact on CL which in turn influences CR. They also find that the main drivers for CR are price, personal service and lack of number portability, while customer care has

no significant impact on it. As an implication they suggest that regulators should promote competition in cellular markets by enforcing efficient number portability procedures between mobile network operators.

Kuo, Wu, and Deng (2009) study relationships among service quality, perceived value, customer satisfaction, and post-purchase intention in mobile value-added services. They find that service quality positively influences both PV and CS; PV positively influences both CS and post-purchase intention and CS positively influences post-purchase intention. These findings imply that providing good service quality enhances PV and CS, and that mobile carriers should prioritize PV to induce on consumers a positive intention to refer or repurchase the service.

Kim, Park, and Jeong (2004) study how CS and the Switching Barrier influence CL in the Korean mobile telecommunication services. The main findings are that CL is determined by CS and the Switching Barrier; CS is mostly determined by service quality which includes: Call quality, value-added services and customer support; switching costs and interpersonal relationships are the factors significantly affecting the Switching Barrier. The main implication is that carriers should maximize CS and the switching barrier in order to enhance CL. To increase customer retention,

carriers should concentrate their efforts on developing value-added services, improving customer support, increasing the cost of switching, and enhancing interpersonal relationships with customers.

Eshghi, Haughton, and Topi (2007) identify the drivers of CL in the U.S. wireless telecommunications industry. Using the propensity to switch providers as a proxy for loyalty, they find that to prevent customer defection, providers are better off improving CS rather than applying 'locking in' practices. The main implication is that carriers' resources should be shifted from attracting new customers (e.g. free phones) to retaining existing customers (e.g. improving service quality).

Leelakulthanit and Hongcharu (2011) identify the key factors for CR and CS in the mobile phone industry in Thailand. They find that promotional value, quality of customer service at shops, and corporate image are the main factors for CS; and that network quality and customer service at call-centers are not very important. They also find that hedonic benefits (e.g. emotional value of feeling good, being confident, experiencing enjoyment, etc.) are the least significant contributors to CS. This challenges recent strategies adopted by Thailand

operators for their corporate image in which there is a shift from a utilitarian focus to a hedonic one.

Khayyat and Heshmati (2012) identify the key factors that determine CS for the mobile phone industry in the Kurdistan region of Iraq. They find that the main drivers of CS are perceived usefulness, perceived ease of use, perceived enjoyment, price, demographic characteristics, and cell phone brand. They also find that improving service quality has a positive effect in achieving higher CS.

Table 1.1 presents a synopsis of all of the above studies. As can be seen in the last column (which contains the main findings concerning consumer satisfaction), roughly all studies identify consumer satisfaction as the main determinant for customer loyalty; and most of them find service quality and image as important drivers of consumer satisfaction.

The present study falls mostly in the exploratory category (however, for some of its models, ECSI has been used as a reference point). The main purpose is to determine the main drivers of CS in the individual mobile telecommunications market in Spain. The results obtained are summarized in the conceptual model illustrated in figure 1.3 (the

satisfaction determinants have been grouped so as to reflect some constructs of the ACSI and ECSI models).

The quality and reliability of the data used in the study is one of its main strengths, obtained from a national coverage survey of 4,249 private mobile consumers interviewed by Spain's Centro de Investigaciones Sociológicas. As can be seen in table 1.1, the size of the sample is larger than in most of the previous referred studies. It is also the only study using data collected from an in-person survey which has advantages concerning the reliability of the responses.

This paper adopts the point of view of individual private consumers, rather than business consumers because, in general, the latter's behavior differ from that of individual consumers and a unified treatment would not be useful. The differences in behavior between private and business consumers in telecommunications have been widely recognized in the literature (e.g. Taylor 1994). Business consumers are very heterogeneous in comparison to residential customers and have different powers of negotiation with operators and widely different sizes. Larger firms usually have communications services needs that are more varied, complex, and specific than those of smaller ones; see CMT (2011) for a

detailed explanation. The heterogeneity between residential and business consumers explains why different types of surveys are applied to each group. See for instance, CIS (2009), Ministerio de Industria (2009), CMT (2011) and SMREC (2012, 2013).

Figure 1.3. Conceptual model

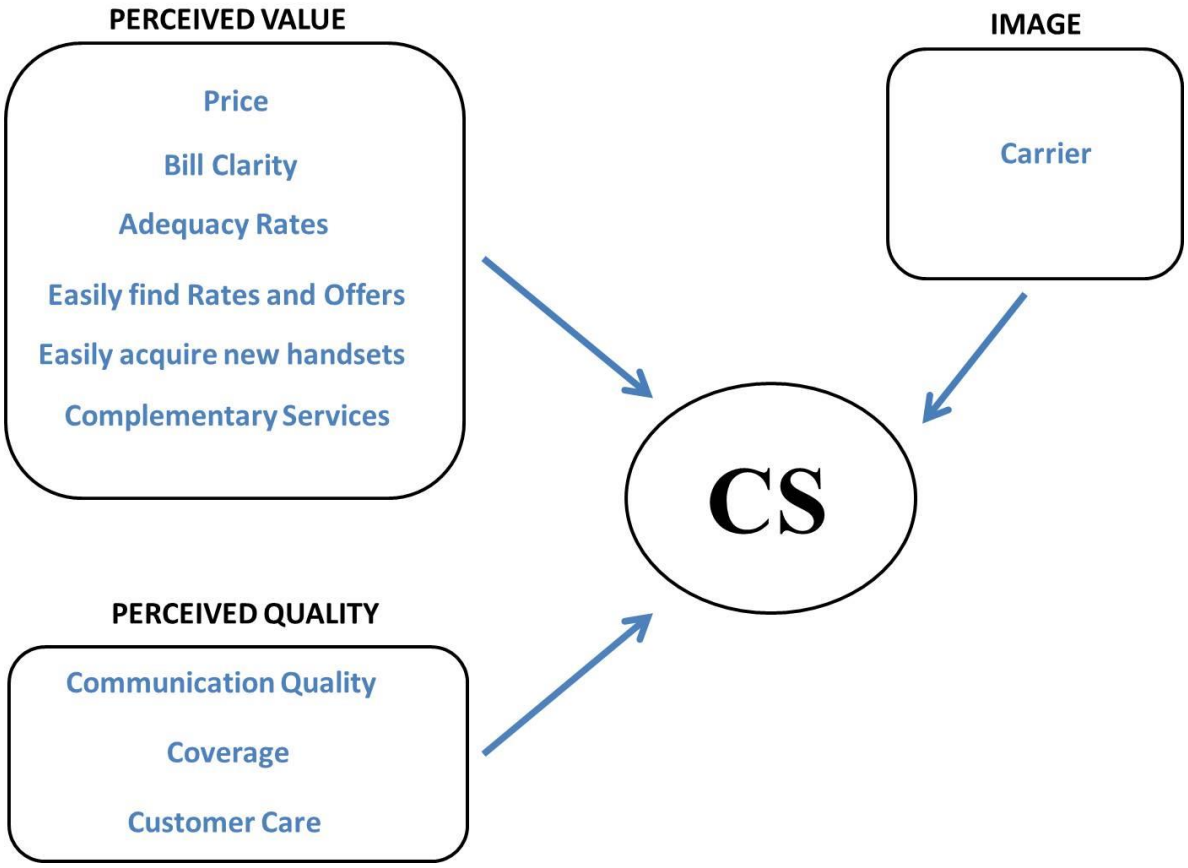


Table 1.1. Research on satisfaction of mobile consumer, at a glance

Authors	Year	Market	Sample		Survey		Main Findings concerning CS
			Size	Respondents	Coverage	Type	
Eshghi et al.	2007	USA	2861	Households	National	phone	Improving CS better than 'locking in' practices for CR
Gerpott et al.	2001	Germany	684	Households	National	phone	CS has a significant impact on CL and CR.
Gijón et al.	2013	Spain	4249	Households	National	in-person	Most important factors for CS: customer care, communications quality and complementary services
Khayyat & Heshmati	2012	Iraq	1458	Households	Kurdistan region	phone	Determinants of CS are: Perceived usefulness, Perceived ease of use, Perceived enjoyment, Price, Demographic characteristics, and cell phone Brand
Kim et al.	2004	Korea	306	Schools, homes and workplaces	National	questionnaire	CS is determined by service quality (call quality, value-added services and customer support).
Kuo et al.	2009	Taiwan	387	College and graduate students	15 major universities	questionnaire	Service quality positively influences both PQ and CS; PQ positively influences both CS and post-purchase intention; CS positively influences post-purchase intention
Leelakulthanit & Hongcharu	2011	Thailand	400	Individuals in department stores	Bangkok	questionnaire	Promotional value, quality of customer service at shops and corporate image are the main factors for CS.
Martensen et al.	2000	Denmark	750	Households	National	phone	Drivers for CS are image, product and service.
Turel & Serenko	2006	Canada	204	Two groups of young adults	one Canadian province	questionnaire	PQ and PV are the key factors affecting CS. CS is a key determinant in CL.
Vranakis et al.	2012	Greece	300	Undetermined	local	questionnaire	Image is the most important factor affecting CS and CL. CS is the main driver of CL

The rest of the paper is organized as follows: section 2 contains the description of the data; section 3 includes different models of customer satisfaction. Section 4 concludes.

2. The Data.

The sample consists of a survey with data on 4,249 mobile consumers: "Satisfacción de usuarios de servicios de telecomunicación," conducted by Spain's Centro de Investigaciones Sociológicas (CIS, 2009). The center is an official government body that produces high-quality statistics that are well-suited to the analysis. The CIS micro-data have been made freely available through the Internet (CIS, 2009). The basic tabulation of the survey is available in the CIS website and Ministerio de Industria (2009). The survey is about individual private consumer satisfaction and includes questions about socio-demographics, different operators, satisfaction with fixed and mobile telephony, Internet, complaints, complaint resolutions, etc.

The data was gathered using personal interviews, and ten different measures of satisfaction with respect to mobile telephony. The

satisfaction scale ranged between one and ten, where one corresponds to the lowest level of satisfaction and ten to the maximum.

The data are representative nationwide by province and autonomous community, gender, age, and major telecommunications carrier, thus making them appropriate for the analysis. Differentiating by operator offers the respective market shares of Movistar (48.0%), Vodafone (30.3%), Orange (18.7%), Yoigo (1.7%), and mobile virtual operators (1.3%).

There is an alternative source of data for quality from the Ministerio de Industria (2012b), but its reliability is limited since it is elaborated with self-reported data by firms.

Table 1.2 contains a demographic profile of the respondents to the survey.

Table 1.2. Demographic profile of respondents and descriptive statistics

		Frequency	Percent
GENDER	Female	2107	49.59
	Male	2142	50.41
AGE	18-24	462	10.87
	25-34	1008	23.72
	35-44	955	22.48
	45-54	735	17.30
	55-64	534	12.57
	65-74	368	8.66
	> 75	187	4.40
LEVEL OF STUDIES	No Studies	113	2.67
	Primary	2226	52.60
	High School	1059	25.02
	College	834	19.71
CITIZENSHIP	Spanish	3778	89.31
	Dual (Spanish+Other)	92	2.17
	Foreign	360	8.51
CARRIER	Movistar	2020	48.03
	Vodafone	1276	30.34
	Orange	786	18.69
	Virtual Mobile Operator	53	1.26
	Yoigo	71	1.69
COMPLAINTS	Delay in establishing the service	56	1.33
	Coverage problems	812	19.26
	Incorrect billing	214	5.18
	Incorrect billing for services not used	212	5.11
	Breach of contract or commercial offer	145	3.48
	Difficulty in cancelling the service	120	2.91
	Difficulty in obtaining the required information	291	6.95
CONTRACT HOLDER	Interviewee	2148	77.74
	Couple	322	11.65
	Father/Mother	118	4.27
	Company	118	4.27
	Others	57	2.06
RATE INCLUDES…	Cheaper calls at certain times or days of the week	1906	50.40
	A minimum consumption per month	1702	44.58
	Flat rates	721	19.31
	Cheaper calls to mobiles of the same operator	2448	64.29
	Cheaper calls to numbers chosen by you	1794	46.69

HAS CONTRACTED MOBILE BROADBAND INTERNET		186	4.39
		Frequency	**Mean**
EXPENDITURE		3858	36.33
SATISFACTION	Overall	4177	7.18
	Price	4045	5.62
	Communication quality	4130	7.09
	Customer Care	3555	6.48
	Bill clarity	3223	6.88
	Adequacy of rates	3605	6.15
	Coverage	4121	7.09
	Easily find rates and offers	3513	6.67
	Easily acquire new handsets	3524	6.44
	Complementary Services	2907	6.63

Note: The numbers of observations vary due to the different number of customers who answer each specific question related to the different types of satisfaction and which is the intersection of the sets of those who answered a given question and those who also answered the other questions. The most limiting one is satisfaction with bill clarity with only 3223 respondents.

2.1. Descriptive statistics of selected variables.

The descriptive statistics of the different measures of satisfaction with different aspects of mobile telephony are given in table 1.2. Note that the averages vary between 5.62 (price) and 7.18 (overall), while the standard errors vary between 1.78 and 2.25, which indicate relatively large variations around the averages. This suggests that it may be worthwhile to perform individual analyses for each one of the measures of satisfaction.

Table 1.3. Variables by operator

		Movistar		Vodafone		Orange		Yoigo		VMO	
		Freq.	**Mean**	**Freq.**	**Mean**	**Freq.**	**Mean**	**Freq.**	**Mean**	**Freq.**	**Mean**
EXPENDITURE		1821	36.41	1163	37.74	732	36.10	70	27.84	46	21.78
AGE		2020	45.85	1276	41.38	786	40.52	71	39	53	46.55
SATISFACTION	Overall	1989	7.16	1252	7.26	773	7.03	70	7.8	53	7.19
	Price	1922	5.38	1216	5.69	758	5.91	69	7.59	52	6.06
	Communication quality	1969	7.13	1245	7.13	765	6.91	70	7.53	52	6.87
	Customer Care	1666	6.35	1088	6.68	678	6.41	63	7.33	44	6.45
	Bill clarity	1499	6.81	993	6.96	625	6.82	50	7.76	42	7.14
	Adequacy of rates	1679	5.98	1097	6.28	704	6.21	63	7.48	47	6.28
	Coverage	1960	7.34	1240	7.01	773	6.58	68	7.32	51	6.71
	Easily find rates and offers	1634	6.57	1082	6.84	679	6.59	61	7.51	44	6.48
	Easily acquire new handsets	1669	6.31	1083	6.66	665	6.36	54	7.06	43	6.49
	Complementary Services	1366	6.59	902	6.72	539	6.54	49	7.16	40	6.55

Table 1.3 contains descriptive statistics of variables according to operator. It can be seen that Yoigo is consistently above the rest in satisfaction measures, while it ranks below in expenditure and age.

The correlation matrix of the satisfaction variables, in table 1.4, shows that different types of satisfaction exhibit little linear correlation among themselves, with simple correlations below 0.7 and multiple correlations with coefficients of determination below 0.7 in all cases.

Table 1.4. Correlations between satisfaction indices

Overall									
Price	0.4938								
Communication Quality	0.5495	0.4650							
Customer Care	0.5844	0.4911	0.5934						
Bill Clarity	0.5326	0.4601	0.5958	0.6431					
Adequacy Rate	0.5575	0.6364	0.5415	0.5964	0.5947				
Coverage	0.4678	0.3442	0.6920	0.4487	0.4896	0.4480			
Easily Find Rates	0.5328	0.4825	0.5372	0.6189	0.5964	0.6024	0.4820		
Easily Handsets	0.5040	0.4277	0.4629	0.5660	0.5153	0.5141	0.4010	0.6661	
Complementary Service	0.5604	0.4639	0.5773	0.6059	0.6019	0.5798	0.4929	0.6848	0.6908

Considering the averages of satisfaction by categories, the one with lowest satisfaction is price, while the overall satisfaction is higher than the average of the rest of the categories. Considering the averages of overall satisfaction by operator, the highest one is Yoigo, while the lowest is Orange.

3. Empirical models for customer satisfaction of mobile consumers.

This section presents the results of the various models of customer satisfaction that have been developed. These models analyze the

determinants of satisfaction and their quantification. Specifically ten models are presented. One of them tries to measure the relative importance of each of the components of satisfaction. The rest of the models focus on analyzing the determinants of different aspects of consumer satisfaction: price, communications quality, customer care, bill clarity, adequacy of rates, coverage, easy-to-find rates and offers, easily-acquired new handsets, and complementary services.

Here, in order to approximate the relationships, general linear models are estimated by least squares, using heteroskedasticity consistent covariance matrix estimators. Satisfaction is treated as cardinal, assuming that the differences between adjacent values of the satisfaction indices are constant across values of the index.

The specified models are linear in the parameters. This has several advantages, such as the direct interpretability of the estimated coefficients and computational convenience.

An alternative model is ordered probit (or logit). This approach has been used by Peel, Goode, and Moutinho (1998). Moreover, Garín-Muñoz, Pérez-Amaral, Gijón, and López (2013), also use OLS and ordered probit. In this case, as in the previously mentioned cases, the results are similar

to those of linear regression in terms of signs and significance of coefficients and in most cases they obtain substantially similar fits to linear regression. The appendix includes ordered probit and logit versions of the main model in table 1.A1. The results in columns five and seven suggest that there is no significant gain in estimating ordered models.

3.1. Model M0. Overall satisfaction and its components.

The first model relates overall satisfaction to each of the other satisfaction measures. It is reasonable to hypothesize that overall satisfaction will be related to the other measures of satisfaction. The correlation with each of the components is not known a priori and needs to be estimated. Table 1.5 summarizes the estimation of the sample correlations of each of the components with overall satisfaction, both, in its basic form, and also including additional variables. This equation can be interpreted as an exploratory tool and its estimated coefficients as correlations, but no causality interpretation is attached. Since all the satisfaction variables are measured in the same units (in a scale from one to ten), their coefficients and standard errors can be compared directly.

Table 1.5. Overall satisfaction and its determinants

	All operators	With satisfaction easily find rates and offers	Without satisfaction easily find rates and offers
Dependent variable:	Overall Satisfaction	Overall Satisfaction	Overall Satisfaction
Vodafone	.065 (.060)		
Orange	.002 (.069)		
VMO	.057 (.188)		
Yoigo	.050 (.244)		
Satisfaction Price	.085*** (.018)	.110*** (.022)	.117*** (.022)
Satisfaction Communication quality	.136*** (.029)	.116*** (.033)	.113*** (.033)
Satisfaction Customer Care	.145*** (.022)	.146*** (.025)	.144*** (.025)
Satisfaction Bill clarity	.067*** (.024)	.054* (.028)	.065** (.028)
Satisfaction Adequacy of rates	.099*** (.023)	.098*** (.027)	.100*** (.026)
Satisfaction Coverage	.067*** (.022)	.061** (.024)	.061** (.024)
Satisfaction Easily find rates and offers	.020 (.025)	.024 (.029)	
Satisfaction Easily acquire new handsets	.068*** (.021)	.063** (.024)	.071*** (.023)
Satisfaction Complementary Services	.124*** (.025)	.115*** (.028)	.117*** (.028)
Minimum monthly consumption		-.198*** (.059)	-.185*** (.059)
Cheaper calls to numbers chosen by you		-.174*** (.058)	-.170*** (.058)
Has contracted mobile broadband Internet		.200 (.151)	.188 (.150)
+16 dummies for A.C. F (p-value)	F(16,2174) = 2.90 (0.0001)		
Constant	1.794*** (.296)	2.238*** (.163)	2.227*** (.162)
Number of outliers	29		
F (joint signif. coefficients) (p-value)	104.94 (0.0000)	124.60 (0.0000)	136.97 (0.0000)
White test, χ^2 (p-value)	278.62 (0.0000)		
Degrees of freedom White	32		
R^2	0.5757	0.4828	0.4810
n	2206	2027	2051
Max VIF	2.75	2.63	2.59

Notes: In parenthesis robust std. error. * Significant at 10%, ** significant at 5% and *** significant at 1%. We use heteroskedasticity consistent covariance matrix estimates (Eicker-White).

The equation is estimated by OLS using STATA 12. Then White's test for heteroskedasticity is performed. Upon detecting heteroskedasticity, the covariance matrix of the estimated coefficients is estimated using the Eicker-White (Eicker, 1967; and White, 1980) heteroskedasticity consistent covariance matrix estimator.

The second column of table 1.5 shows first that all coefficients of the satisfaction indices are positive and significant. It also shows that the operator dummies are insignificant, as can be expected, since the operator effect should already be embedded in each of the components of satisfaction, while the dummies for Autonomous Communities are jointly significant. The third column of table 1.5 contains the estimates of a variation of the previous equation deleting the operators and including three additional significant explanatory variables contained in our dataset: minimum monthly consumption, cheaper calls to numbers chosen by you and has contracted mobile broadband Internet. The results suggest that there is relatively little variation in the estimates and thus the possible omitted variable bias is small. The preferred specification is the one in the fourth column that excludes an irrelevant variable. This equation measures partial correlations, but does not represent a causal relationship.

3.2. Models M1 to M5. Aspects of satisfaction.

This subsection contains the quantification of the effects of the variables that influence the satisfaction with each aspect, together with overall satisfaction.

Table 1.6 includes two groups of determinants of the satisfaction with each aspect.

a. The valuations of each of the operators by their customers, that is, the operator effect.

b. The factors that are influential in the satisfaction of the individual customers with respect to their mobile carriers such as geographical location, age, gender, education, expenditure, etc.

Table 1.6 contains the estimation of the different models for overall satisfaction and four selected components of satisfaction. Columns M1 through M5 correspond to the five different models. The dependent variable for each regression is in the second row of the table, starting with overall satisfaction, satisfaction with price, satisfaction with the quality of communications, satisfaction with customer care, and satisfaction with bill clarity.

Table 1.6. Equations of overall and specific items of individual customer satisfaction

Endogenous ⇨	M1 Overall satisfaction	M2 Satisfaction Price	M3 Satisfaction Communication quality	M4 Satisfaction Customer Care	M5 Satisfaction Bill clarity
Vodafone	.079 (.065)	.316*** (.089)	.014 (.063)	.323*** (.083)	.181** (.084)
Orange	-.109 (.074)	.460*** (.102)	-.191** (.077)	.100 (.102)	.144 (.097)
VMO	.348 (.237)	.951*** (.359)	.071 (.225)	.480 (.303)	.643** (.294)
Yoigo	.497** (.232)	2.121*** (.251)	.321 (.218)	1.137*** (.218)	1.031*** (.269)
Minimum monthly consumption	-.010* (.057)	.252*** (.078)			
Cheaper calls at certain times or days					-.223*** (.074)
Cheaper calls to numbers chosen by you				.188** (.075)	.259*** (.074)
Less than one year in that company					-.246** (.114)
Has contracted mobile broadband Internet	.469*** (.129)				
Expenditure	-.003*** (.001)	-.015*** (.002)	-.003** (.001)	-.001 (.001)	.001 (.001)
Expenditure sq	8.81e-06** (3.84e-06)	.00003*** (5.10e-06)	5.43e-06 (5.17e-06)		
Spaniard	-.268*** (.090)	-.340*** (.120)	-.347*** (.090)	-.455*** (.110)	-.059 (.127)
Male	-.167*** (.055)	-.033 (.075)	-.088 (.054)	-.171** (.071)	-.050 (.070)
Age	.002 (.002)	-.0001 (.003)	.004* (.002)	.011*** (.003)	.005* (.003)
Education	-.015** (.006)	-.017** (.008)	-.013** (.005)	-.013 (.008)	.001 (.008)
Constant	7.502*** (.186)	6.105*** (.248)	7.387*** (.183)	5.905*** (.240)	6.07*** (.249)
Num. outliers	55	2	38	70	31
F (p-value)	429.92 (0.0000)	9.50 (0.0000)	389.69 (0.0000)	572.53 (0.0000)	379.94 (0.0000)
R^2	0.2175	0.0748	0.1461	0.2083	0.1487
n	3457	3436	3730	3074	2692
Max VIF	3.23	4.03	3.12	2.10	2.19

Notes: In parenthesis Robust Std. Error. * Significant at 10%, ** significant at 5% and *** significant at 1%. We use heteroskedasticity consistent covariance matrix estimates (Eicker-White).

The first column contains explanatory variables, which start with the carriers: Vodafone, Orange, VMO and Yoigo (it is used Movistar as a basis for comparison, since it has the largest market share and was the previous incumbent). These are followed by the rest of the explanatory variables. And finally, the selected summary statistics such as the F test of joint significance, the White test for heteroskedasticity, coefficient of determination, the number of observations, and the maximum variance inflation factor.

3.2.1. Model M1. Overall satisfaction and its explanatory variables.

Starting with column M1 in table 1.6, the dependent variable is the overall satisfaction. The estimated coefficient for Yoigo is 0.50 (rounded), which means that being a customer of Yoigo makes you half a point happier than being a customer of Movistar. The rest of the coefficients of the operators are insignificant. These are the operator effects that can be identified with the image of the ECSI satisfaction model of section 1.

Starting with the next block of explanatory variables in the model of overall satisfaction, M1, if a customer has contracted mobile internet, he

tends to be more satisfied by 0.47 points. Also Spaniards tend to be less satisfied than foreign nationals by -0.27 points. This may be due to the fact that many foreign nationals come from countries with inferior mobile quality and tend to be more appreciative than Spaniards. Males tend to be less satisfied than females by -0.17 points. The coefficient is statistically significant but small.

The relationship between overall satisfaction and expenditure (total bill for mobile services) has a u-shape. For low values of expenditure the satisfaction is decreasing with expenditure, due to the linear term, (-0.003) while for higher values, the quadratic term dominates and conforms a positive relationship. Education has a negative and significant coefficient of -0.015.

To control for heterogeneity across autonomous communities, sixteen dummies and a constant were used. Individual dummies were also used in each model to treat the outliers (with residuals larger than three standard errors).

The bottom of the column contains the number of observations (3,457), the coefficient of determination (0.22), the F test of joint significance (429.92) which is highly significant, and also the maximum

variance inflation factor, 3.23, which does not suggest strong multicollinearity, since it is below the standard cutoff of five. The variance-covariance matrix of the estimated coefficients is estimated using the Eicker-White (White, 1980) estimator.

3.2.2. Models M2-M5. Satisfaction with specific items.

Models M2 to M5 are specified and estimated using similar techniques to those of model M1.

1. In the equation of satisfaction with respect to price, M2, all the differences between Movistar and the other operators are positive and significant, with the largest one for Yoigo, which is 2.06 points. This suggests that all operators offer more satisfaction with respect to price than Movistar, and also that Yoigo is especially successful with its customers regarding price.

2. Again, being Spaniard is significant and negative (-0.34). Male is insignificant as well as age. Education is negative, -0.017 and significant at the 5%. With respect to satisfaction with communications quality, M3, no significant differences across operators are found, except for Orange, which is negative: -0.191 which suggests that they are technically

similar. The variables expenditure and expendituresq have the usual plus and minus signs and being Spaniard is negative (-0.35). Male and age are insignificant at the 5%, while education is negative (-0.13) and significant at the 5%.

3. With respect to satisfaction with customer care, M4, Vodafone and Yoigo gave more satisfaction than Movistar, which suggests that this aspect may have been neglected by certain operators. Cheaper calls is significant and positive while being Spaniard affects negatively -0.46, male has a negative effect (-0.17) and age has a positive effect. Education is insignificant in this equation. Satisfaction with bill clarity, M5, is higher for Vodafone, VMOs and especially for Yoigo, than it is Movistar, which may be due to a different strategy of entrants for improving that aspect of the service with respect to operators such as Movistar and Orange. Cheaper calls at certain times or days is significant and negative (-0.22), which is somewhat surprising, while cheaper calls to numbers chosen by you is significant and positive (0.26). Less than one year in that company is negative (-0.25) and significant at the 5%. The rest of the variables are insignificant except age, which is positive and significant at the 10% only. Controlling for the effect of other relevant variables, Movistar is the carrier that gives less satisfaction to its

customers, except in communications quality, coverage, and complementary services (see also the appendix). This agrees with the simple averages of satisfactions shown in figure 1.4 and with anecdotal evidence. The next least satisfying carriers are Vodafone and Orange, which come very close in most aspects of consumer satisfaction, except for Orange's significantly worse coverage.

4. In most aspects of satisfaction the effect of being Spaniard is negative and the effect of male is also negative, but in most cases insignificant. On the other hand, education tends to have a negative effect on satisfaction, which is in some cases insignificant.

Similar estimations have been performed controlling for the 50 different provinces instead of the 17 autonomous communities. They are available from the authors upon request. Similar coefficients to those in table 1.6 are found. The hypothesis that the coefficients are equal against the alternative that they are different is tested. F tests of homogeneity of coefficients do not reject the null hypothesis of homogeneity of coefficients at the 0.05 level of significance. Therefore, the inference is based on table 1.5, which controls for autonomous communities, includes

fewer parameters, and allows for more efficient estimation than the models that include dummies for the 50 provinces.

Table 1.A2 of the appendix shows models M6-M10 which completes the analysis of the items of satisfaction contained in the survey.

4. Conclusions

The Spanish mobile telecommunications market scored the lowest in European customer satisfaction in 2011 and 2012 (SMREC, 2012, 2013). On the other hand, previous literature recognizes the central role of customer satisfaction in achieving customer loyalty, retention and ultimately profits of mobile telecommunications operators.

Eshghi et al. (2007) highlight the importance of customer satisfaction in obtaining consumer loyalty and conclude that carriers should be better off improving customer satisfaction rather than locking consumers in. Gerpott et al. (2001) conclude that customer satisfaction is crucial for customer retention, while Khayyat and Heshmati (2012) find that the main drivers of customer satisfaction are perceived usefulness, perceived ease of use, perceived enjoyment, price, demographic characteristics,

and cell phone brand. They also find that improving service quality has a positive effect in achieving higher customer satisfaction.

Kim et al. (2004) conclude that mobile carriers must, above all else, maximize customer satisfaction. Kuo et al. (2009) point out that customer satisfaction is a function of service quality, customer service and system reliability, while Leelakulthanit and Hongcharu (2011) find that promotional value, quality of customer service at shops and corporate image are the main factors for customer satisfaction. Martensen et al. (2000) conclude that the main drivers of customer satisfaction are image, product, and service quality. Turel and Serenko (2006) suggest that product value and product quality are the main drivers of customer satisfaction and customer loyalty, while Vranakis et al. (2012) find that customer satisfaction is the main driver for customer loyalty and that image is the most important factor affecting customer satisfaction and customer loyalty.

Turning to Spanish studies, CIS (2009) analyzes the same data used in this paper but it only contains a basic tabulation of each question and reaches no specific conclusion. Ministerio de Industria (2009, p. 2-5) analyzes the same data using tabulations and some verbal analysis, but

no quantitative methods. This is an official study which tends to reach positive and optimistic conclusions. It shows that mobile telephony obtains high average satisfaction scores but does not distinguish by operators. The report finds that more than half of the incidences with mobile operators have been resolved in an unsatisfactory way for the consumer. The report recognizes that customer services are "an important source of dissatisfaction for users and it will require greater attention by the operators…" In general, the study concludes that consumers should be conscious of the need of getting more information when using the services and the operators should make substantial improvements in customer service.

CMT (2011) deals exclusively with business customers, so the conclusions cannot be compared directly with those of this paper. The report is merely descriptive and contains very few conclusions, as can be seen in page 7. The CMT report points out the big differences between most business customers and residential customers. The report also stresses the heterogeneity within business customers themselves, among other things.

The present paper analyzes customer satisfaction among private individual consumers of mobile telecommunications in Spain and the factors associated with it. Data on 4,249 individual mobile consumers from the Spanish survey (CIS, 2009) are used. The data include several measures of satisfaction, different types of complaints, place of residence (autonomous regions and province), gender, age, educational level, and other socioeconomic and technical variables. Regression models are formulated and estimated for different aspects of satisfaction and its possible determinants.

First, this paper concludes that each individual item of satisfaction is positively correlated with overall satisfaction, and the most correlated items are, in this order, customer care, communications quality and complementary services, followed by adequacy of rates, price, easily-acquired new handsets, bill clarity and coverage, while the least important is the ability to easily find rates and offers. Service providers should consider the importance that consumers attach to customer care and make a special effort to invest in that area. These results are robust when additional relevant control variables are included. Second, the determinants of overall satisfaction are considered. After controlling for the explanatory variables, the results indicate that customers are less

satisfied with larger, well-established carriers, like Movistar and Vodafone, and more satisfied with smaller and newer operators.

When considering satisfaction with other attributes, it is found that Movistar is the carrier that gives less satisfaction to its customers, except in communications quality, coverage, and complementary services. Spaniards tend to be less satisfied than foreign nationals and males tend to be less satisfied than females.

This suggests that if these variables can be manipulated by operators and/or regulators, they could substantially enhance consumer satisfaction, a key factor for mobile consumers, operators and regulators in Spain. This is in the same spirit of several international publications mentioned earlier.

Switching costs are also relevant for customer satisfaction, as pointed out in the international literature, in particular the costs associated to number portability and lock-in contracts. Unfortunately, in the present cross-section data there is not enough information to approximate the switching costs. That is why their effect cannot be isolated. This is one of the limitations of the present study.

Increasing customer satisfaction is a win-win strategy for all players in the Spanish mobile market. By doing so, customers would be better off, operators could increase customer retention, and it could also help regulators improve the mobile market's poor international image. Three types of policy recommendations can be derived from these conclusions:

1) From the point of view of the operators: in mature mobile markets it may be cost effective to shift scarce resources from customer acquisition to customer retention. Doing so can increase consumer satisfaction which is central for consumer retention.

The results of this paper indicate how this can be done in Spain, and allow the operators to design cost effective strategies for enhancing consumer satisfaction. For instance, a successful effort to reduce unsatisfactorily resolved complaints about billing, and also the difficulty for obtaining the required information, can result in a substantial improvement in satisfaction of up to 1.5 points. This is probably a cost effective policy by operators.

The outsourcing of call centers to companies that operate from Latin America was common in the past. This is recognized as a source of low-quality customer service due to communication difficulties, poor training,

and physical, as well as cultural distance. Movistar is in the process of migrating its call centers back to Spain. This is recognized as a sensible though costly move to improve quality of service, since salaries are four to five times higher in Spain.

2) From the policy maker point of view, these results can help to design public policies to improve the poor performance of the mobile phone market in terms of satisfaction in Spain, in absolute terms and in comparison to other European countries, SMREC (2012). The results of this paper can help identify which aspects of satisfaction can be improved. This includes gathering additional survey data from the perspective of the consumer, publishing information on quality of service from the point of view of the consumers, encouraging the operators to improve customer satisfaction and possibly transferring the authority of the office for attention to telecommunications users to an independent regulator, like CMT or its successor when it comes into operation (López et al., 2013).

3) Improving customer satisfaction is desirable in itself and will be reflected in independent surveys like SMREC (2012) that are performed periodically. However, the gap in customer satisfaction between Spain

and the rest of Europe seems on the one hand too wide to be closed and, on the other hand too wide to be true, and deserves further attention by researchers. A sequel to this project using new survey data will analyze the reasons behind this apparently important gap.

One limitation of the study is that the 2009 data may seem outdated, but it must be noted that the purpose of this paper is to study relationships that are expected to be stable over time.

Another limitation of the study, due to the type of survey data, is the fact that the dynamics of an individual's satisfaction cannot be studied along time. Churning is a factor that may be worth studying using panel data if available.

While the results are specific to Spain, it would be interesting to analyze data from other countries, since it is possible that similar results hold elsewhere.

This study suggests the need for further research on this and related topics. A future research agenda would include beginning with a study on the determinants of the complaints by consumers of mobile operators in Spain and continuing with related research analyzing on mobile telecommunications consumer protection in Spain in comparison with

other European countries. A third topic is the study of the satisfaction indices reported by SMREC (2013) in order to analyze the reasons behind the significant decline in 2011 and why there was such a large gap between Spain and the rest of the Europe in 2011 and 2012.

Appendix

Table 1.A1.Overall satisfaction and its determinants

	OLS	OLOGIT	OPROBIT	OLS	OLOGIT	OPROBIT
Movistar	-.050 (-0.21)	-0.22 (0.56)	-0.08 (-0.37)	---	---	---
Vodafone	.015 (0.06)	-0.13 (-0.34)	-0.03 (-0.15)	---	---	---
Orange	-.049 (-0.20)	-0.22 (-0.57)	-0.10 (-0.43)	---	---	---
VMO	.007 (0.02)	-0.24 (-0.51)	-0.03 (-0.12)	---	---	---
Satisfaction Cost	.085 (4.77)	0.13 (4.17)	0.08 (4.73)	0.10 (5.41)	0.14 (4.78)	0.09 (5.38)
Satisfaction Communication quality	.136 (4.74)	0.25 (5.26)	0.12 (5.04)	0.13 (4.55)	0.24 (5.09)	0.12 (4.88)
Satisfaction Customer Care	.145 (6.51)	0.21 (5.95)	0.12 (6.57)	0.14 (6.46)	0.22 (6.12)	0.12 (6.61)
Satisfaction Bill clarity	.067 (2.80)	0.12 (3.09)	0.06 (2.99)	0.08 (3.19)	0.13 (3.45)	0.07 (3.37)
Satisfaction Adequacy of rates	.099 (4.24)	0.14 (3.58)	0.08 (3.96)	0.10 (4.32)	0.14 (3.77)	0.08 (4.06)
Satisfaction Coverage	.067 (3.08)	0.11 (3.25)	0.06 (3.47)	0.07 (3.22)	0.12 (3.49)	0.07 (3.66)
Satisfaction Easily find rates and offers	.02 (0.81)	0.05 (1.34)	0.02 (1.12)	---	---	---
Satisfaction Easily acquire new handsets	.068 (3.21)	0.10 (2.79)	0.06 (3.32)	0.08 (3.83)	0.11 (3.56)	0.07 (4.02)
Satisfaction Complementary Services	.124 (4.90)	0.20 (5.00)	0.11 (5.23)	0.12 (5.01)	0.21 (5.24)	0.11 (5.47)
+16 dummies for A.C. F (p-value)	F(16,2174) = 2.90 (0.0001)					
Constant	1.844 (6.22)					
Number of outliers	29	29	29	29	29	29
F (joint signif. coefficients) (p-value)	104.94 (0.0000)	1408.59 (0.0000)	1523.53 (0.0000)	126.29 (0.0000)	1416.17 (0.0000)	1521.01 (0.0000)
White test, χ^2 (p-value)	278.62 (0.0000)					
Degrees of freedom White	32	31	31			
R^2	0.5757	0.2204	0.2189	0.5724	0.2189	0.2172
n	2206	2206	2206	2240	2240	2240
Max VIF	2.75	2.75	2.75	2.75	2.75	2.75

Notes: In parenthesis t-statistics. Heteroskedasticity consistent covariance matrix estimates (Eicker-White) are used in the OLS regressions.

Table 1.A2. Equations of additional indices of satisfaction

Endogenous ⇨	M6 Satisfaction adequacy rates	M7 Satisfaction coverage	M8 Satisfaction easily find rates and offers	M9 Satisfaction easily acquire new handsets	M10 Satisfaction complementary services
Vodafone	.273*** (.087)	-.418*** (.078)	.272*** (.082)	.428*** (.106)	.109 (.085)
Orange	.248** (.010)	-.891*** (.101)	.060 (.098)	.277** (.127)	-.081 (.100)
VMO	.497 (.360)	-.623* (.346)	.119 (.381)	.419 (.478)	.169 (.325)
Yoigo	1.478*** (.232)	-.134 (.255)	.986*** (.222)	.896** (.362)	.635** (.275)
Contract Holder: respondent				.924*** (.321)	
Contract Holder: couple				.756** (.351)	
Contract Holder: father/mother				1.148*** (.401)	
Contract Holder: other				1.442** (.644)	
Cheaper calls at certain times		-.179** (.071)			
Cheaper calls to numbers chosen	.263*** (.076)	.182** (.072)	.254*** (.073)	.309*** (.094)	.206*** (.075)
Has contracted mobile broadband Internet	.666*** (.200)		.454*** (.172)	.586*** (.190)	.415** (.164)
Expenditure	-.009*** (.002)	-.0007 (.001)	-.0004 (.001)	.002 (.001)	.0005 (.001)
Expenditure sq	.00001*** (4.17e-06)				
Spaniard	-.242** (.116)	-.476*** (.104)	-.145 (.111)	-.253 (.171)	-.150 (.113)
Male	.034 (.073)	.016 (.067)	-.117* (.070)	-.131 (.094)	-.065 (.073)
Age	.0009 (.003)	.0003 (.002)	-.003 (.003)	.020*** (.004)	.003 (.003)
Education	-.010 (.008)	-.003 (.007)	-.001 (.008)	.002 (.010)	-.007 (.008)
+16 dummies for A.C. F (p-value)	F(16,3105)= 10.12 (0.0000)	F(16,3506)= 5.46 (0.0000)	F(16,3250)= 8.81 (0.0000)	F(16,2253)= 8.64 (0.0000)	F(16,2684)= 10.60 (0.0000)
Constant	6.000*** (.245)	7.576*** (.219)	6.173*** (.231)	4.103*** (.471)	5.825*** (.240)
Number of Outliers	2	33	16	27	24
F (p-value)	8.67 (0.0000)	375.12 (0.0000)	418.47 (0.0000)	203.11 (0.0000)	16.12 (0.0000)
White test, χ^2	92.24	95.05	96.17	123.36	63.04
R^2	0.0775	0.1359	0.0893	0.1442	0.1421
n	3124	3279	3075	2139	2541
Max.VIF	4.21	2.15	2.08	6.93	2.27

Notes: In parenthesis Robust Std. Error. * Significant at 10%, ** significant at 5% and *** significant at 1%. We use heteroskedasticity consistent covariance matrix estimates (Eicker-White).

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Capítulo 2 – Chapter 2: Complaints and satisfaction of residential mobile phone users in Spain

Abstract

Consumer satisfaction is a key determinant of customer retention, profitability of operators, consumer welfare and a strategic variable for competition and international comparisons. Spain's mobile customer satisfaction is the lowest in the European Union according to recent EU studies. Consumer complaints are numerous according to official statistics. In turn, consumer complaints (and how well they are dealt with) influence customer satisfaction and retention. This paper analyzes the determinants of the different types of complaints filed by residential consumers in Spain using the survey CIS and the report of Ministerio de Industria. The first survey uses disaggregated information on 4,249 residential consumers while the report summarizes the complaints received by the Ministry of Industry's Telecommunications Customer Service Office. Econometric models are specified and estimated to quantify the relationships. The results are used to characterize the profiles of typical complainers as well as the possible existence of a complaints divide due to income, age or education. Finally, policy recommendations are proposed to improve customer satisfaction and diminish the reasons for filing complaints.

Resumen

La satisfacción del consumidor es un factor determinante de la retención de clientes, la rentabilidad de los operadores, el bienestar del consumidor y una variable estratégica para la competencia y las comparaciones internacionales. Satisfacción del cliente móvil de España es la más baja de la Unión Europea de acuerdo con estudios recientes de la UE. Las quejas de los consumidores son numerosas, según estadísticas oficiales. A su vez, las quejas de los consumidores influyen en la satisfacción y la retención del cliente. Este trabajo analiza los determinantes de los diferentes tipos de quejas presentadas por los consumidores residenciales en España utilizando la encuesta del CIS y el informe del Ministerio de Industria. La primera encuesta utiliza la información desglosada sobre 4.249 consumidores residenciales, mientras que el informe se resumen las denuncias recibidas por el Ministerio de la Oficina de Servicio al Cliente de Telecomunicaciones del Ministerio de Industria. Se especifican y estiman modelos econométricos para cuantificar las relaciones. Los resultados se utilizan para caracterizar los perfiles de los que se quejan, así como la posible distinción entre quejas según ingresos, edad o educación. Por último, se proponen recomendaciones de política para mejorar la satisfacción del cliente y disminuir las razones para presentar quejas.

1. Introduction

Complaints are an indicator of how an organization runs. Fornell (1992) views customer satisfaction as a strategic variable within the enterprise, and a key determinant for better commercial relationships with customers.

Sometimes an increase in the volume of complaints may lead the company to remove service of the same, but this leads to more complaints (Fornell & Westbrook, 1984). That is why it is important to have good customer complaints service management within the company (Jeschke, Schulze & Bauersachs, 2000).

No company is perfect, all of them make mistakes and that is unavoidable. But what you can avoid is having unhappy customers by appropriate complaint management. Companies must learn from their mistakes and turn those dissatisfied customers into loyal brand customers (Hart, Heskett & Sasser, 1990). If there are good relations between the company and the customer, the customer will make them more loyal and the company will obtain more profits (Lovelock & Wirtz, 2007).

However only a fraction of those who had bad experiences file a complaint. For every complaint received, there are at least nineteen other dissatisfied customers who do not make the effort to make a complaint (Bateson & Hoffman, 1999).

When a dissatisfied consumer seeks redress, however, the service provider is given an opportunity to resolve the situation. A service provider can also learn from complaints how to prevent similar service failures in the future. Thus, customer complaints are essential for successful service provision recovery (Blodgett et al., 1993; Tax et al., 1998).

Few empirical studies, have explored how technology affects complaining behavior, and if complaining rates are actually higher in techonology-based services. Likewise, there is little empirical evidence on how technology alters firm´s response frequency (Snellman & Vihtkari, 2003).

A customer dissatisfied with customer service is likely to convey that experience to ten people or more, while a happy customer would only go to five people (Stauss, 1997). Moreover, with the incorporation of new technologies into our daily life, customers are able to communicate their satisfaction or dissatisfaction globally at a low cost.

According to Lovelock and Wirtz (2004) barriers encountered by the consumer to make a complaint are problems with the process. They spend a lot of time and energy and the lack of confidence that agencies will assume the necessary actions to remedy the problem are other kind of the problems at the moment of complaining. The dissatisfaction or the fear of being treated rudely or being embarrassed discussing with the employee, uncertain whether or not capable of evaluating the product or service that the company provides complete the list of barriers.

It has been mentioned that consumer affairs units have been largely unable to mobilize corporate resources to eliminate or modify the organizational practices that give rise to the discontent, thus allowing perpetuation of the problems causing dissatisfaction (Fornell, 1976).

On the other hand, most customers filing a complaint are dissatisfied with the handling by customer service departments. Tax, Brown, and Chandrashekaran (1998) show that customers evaluate complaint incidents in terms of results, procedures and interpersonal treatment. Vidales (2012) recommends to speed up the procedures and make adaptable to each specific ease but that is not happening in reality.

Tax and Brown (1998) suggest that consumers who feel embarrassed through about attracting attention might feel more comfortable complaining through a technological interface than directly to another person.

In addition, if the complaints are repeated, the perception of overall satisfaction of the customers and the likelihood to recommend the company diminishes (Maxham & Netemeyer, 2002). On the other hand, dissatisfaction can lead customers to switch companies and give negative references to other potential buyers, which negatively affects retention rates, profitability and company image (Filip, 2013).

Vidales (2012) in view of the figures for Spain, consumer groups blame the authorities for failing to act firmly to halt the continuing rise of complaints. They demand more regulation to protect the rights of

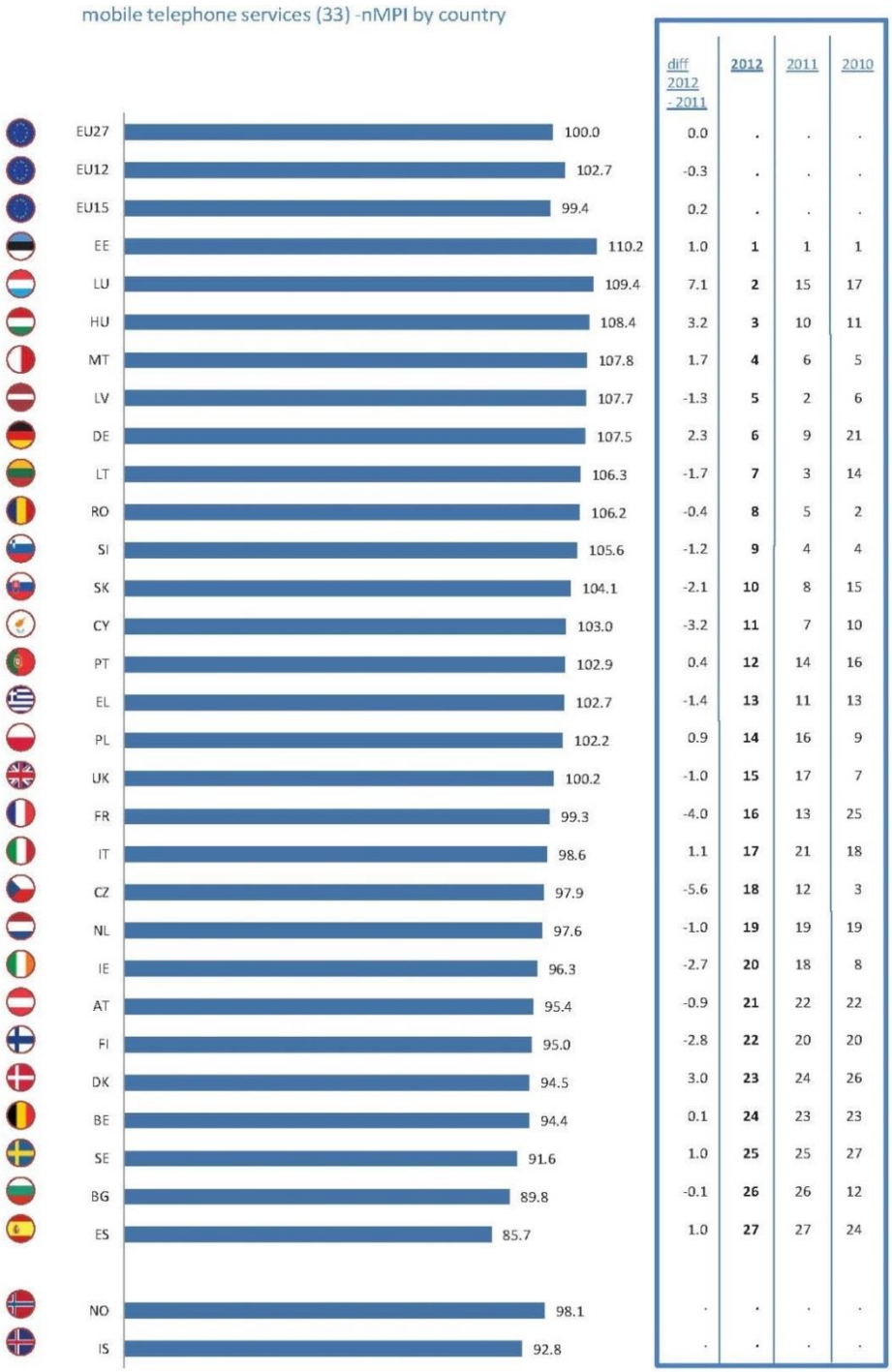
customers and above all more dissuasive sanctions in particular to telecommunications companies.

Nevertheless these companies considered that figures of complaints are low if it is considered the number of users: 58,176,953 of mobile lines, according to the last recount of the "Comisión del Mercado de las Telecomunicaciones" like it is said in Vidales (2012).

As has been suggested, this issue is important for companies, consumers and governments. Technology is constantly developing and it has to satisfy those who pay for it. In the other hand, governments have to create the correct situation with policies that can support the progress and, at the same time, that protect consumers.

Figure 2.1 shows that spanish mobile consumer satisfaction ranks the lowest in the European Union, as seen in Significant Marketing Research-European Commission (SMREC)(2012, p. 264), at a considerable distance from Bulgaria, which was the next-to-last country on the list. Moreover, this market was the second worst considered in the ranking of 51 Spanish markets, just above the mortgage market according to SMREC (2013).

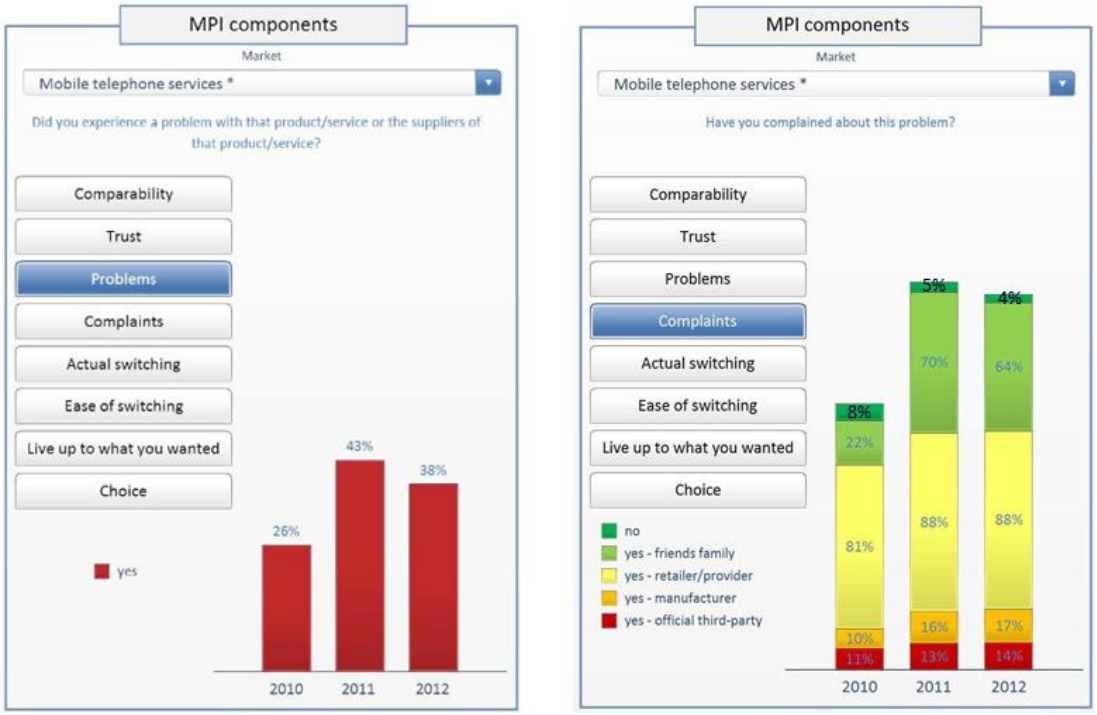
Figure 2.1. Satisfaction with mobile telephone services across Europe



		diff 2012 -2011	2012	2011	2010
EU27	100.0	0.0	.	.	.
EU12	102.7	-0.3	.	.	.
EU15	99.4	0.2	.	.	.
EE	110.2	1.0	1	1	1
LU	109.4	7.1	2	15	17
HU	108.4	3.2	3	10	11
MT	107.8	1.7	4	6	5
LV	107.7	-1.3	5	2	6
DE	107.5	2.3	6	9	21
LT	106.3	-1.7	7	3	14
RO	106.2	-0.4	8	5	2
SI	105.6	-1.2	9	4	4
SK	104.1	-2.1	10	8	15
CY	103.0	-3.2	11	7	10
PT	102.9	0.4	12	14	16
EL	102.7	-1.4	13	11	13
PL	102.2	0.9	14	16	9
UK	100.2	-1.0	15	17	7
FR	99.3	-4.0	16	13	25
IT	98.6	1.1	17	21	18
CZ	97.9	-5.6	18	12	3
NL	97.6	-1.0	19	19	19
IE	96.3	-2.7	20	18	8
AT	95.4	-0.9	21	22	22
FI	95.0	-2.8	22	20	20
DK	94.5	3.0	23	24	26
BE	94.4	0.1	24	23	23
SE	91.6	1.0	25	25	27
BG	89.8	-0.1	26	26	12
ES	85.7	1.0	27	27	24
NO	98.1	.	.	.	.
IS	92.8	.	.	.	.

Source: Significant Marketing Research-European Commission, GFK, SMREC, (2012), "Monitoring consumer markets in the European Union".

Figure 2.2. Mobile telephone services problems and complaints of Spain



Source: Significant Marketing Research-European Commission, GFK, SMREC, (2013). Monitoring consumer markets in the European Union. Scoreboard.

Figure 2.2 shows problems and complaints about mobile telephone services in Spain. The first column shows if consumer experienced a problem with mobile telephone services, and the second column shows if consumer had complained about this problem. On 2010 there were a 26% of problems and only an 8% of the surveyed who had no complaints, 81% of those who had problems complained to the retailer/provider and 10% to the manufacturer; only 11% turned to public authorities or consumer organizations. On 2011, there were 43% of problems, 88% of those who had problem complained to the retailer, 16% to the manufacturer and 13% turned to public authorities or consumer organizations. And, in that year only 5% had no complain, and

4% had no complaints on 2012. But, on 2012 there were 38% of problems and the 88% of those who had problems complained to the retailer or provider, 17% to the manufacturer and 14% to public authorities or consumer organizations.

In European Commission (2011), it is said that consumer appear to be willing to complain when necessary if problems arise, but consumers tend not to seek further redress if complaints are not satisfactorily resolved and consumers who decided not to go to court were put off because it would cost too much and/or take too long or would be too complicated. This identifies a market failure from a consumer perspective and this is an important point of the analysis.

A research question of the present paper is to assess how customer complaints influence customer satisfaction of residential consumers of mobile phones in Spain and the factors that may be associated to them.

Since it is not easy to file a complaint about telecommunications in Spain, an additional objective is to analyze the different ways to make a complaint and present the difficulties encountered along the way in each of them.

The rest of the paper is structured as follows. Section 2 begins with the exposition of some relevant figures. Section 3 contains a description of the data, and it continues with section 4 presents the empirical models for customer satisfaction and complaints. Finally, section 5 contains the conclusions.

2. The Data

The sample consists of a survey with data on 4,249 mobile consumers: "Satisfacción de usuarios de servicios de telecomunicación", conducted by Spain's Centro de Investigaciones Sociológicas (CIS, 2009). The center is an official government body that produces high-quality statistics that are well-suited to the analysis. The data was gathered using personal interviews. The CIS micro-data have been made freely available through the Internet (CIS, 2009). The survey's focus is individual private consumer satisfaction and includes questions about socio-demographics, different operators, satisfaction with fixed and mobile telephony, Internet, complaint resolutions, etc.

The data are representative nationwide by province and autonomous community, gender, age, as it can be seen in table 2.1. The data about Spanish population is from the National Statistics Institute of Spain (Instituto Nacional de Estadística, INE, 2010; 2013a; 2013b). The National Statistics Institute is an autonomous administrative body with legal personality, under the Ministry of Economy.

Table 2.1. Sample characteristics versus the 2009 Spain population

		Sample (4953 respondent)		Spain Demographic*
		Frequency	Percent	Percent
GENDER	Female	2,530	51.08	51.06**
	Male	2,423	48.92	48.94**
AGE	18-24	482	9.73	9.66
	25-34	1,021	20.61	20.13
	35-44	1,001	20.21	20.13
	45-54	805	16.25	16.73
	55-64	641	12.94	13.10
	65-74	566	11.43	10.02
	> 75	437	8.82	10.23
LEVEL OF STUDIES	No Studies	113	2.67	11.19***
	Primary	2,226	52.60	20.22
	High School	1,059	25.02	45.21
	College	834	19.71	23.38
CITIZENSHIP	Spanish	3,778	89.31	87.32+
	Dual (Spanish+Other)	92	2.17	0.96+
	Foreign	360	8.51	11.72+
AUTONOMOUS COMMUNITY	Andalucía	877	17.71	17.80
	Aragón	148	2.99	2.87
	Asturias, Principado de	128	2.58	2.30
	Baleares, Islas	89	1.80	2.34
	Canarias	187	3.78	4.54
	Cantabria	66	1.33	1.26
	Castilla y León	292	5.90	5.47
	Castilla - La Mancha	217	4.38	4.44
	Cataluña	794	16.03	15.87
	Comunidad Valenciana	546	11.02	10.93
	Extremadura	121	2.44	2.35
	Galicia	324	6.54	5.96
	Madrid, Comunidad de	666	13.45	13.72
	Murcia, Región de	149	3.01	3.16
	Navarra, Comunidad Foral	67	1.35	1.34
	País Vasco	248	5.01	4.65
	Rioja, La	34	0.69	0.69

* Source: INE (2010). Indicadores sociales 2010.
** Census: 1st march, 2009. Source: INE (2013a)
***Here 2.32% are illiterate and 8.87% no studies.
+ Census: 2009 first quarter. Source: INE (2013b)

This paper will focus on customer complaints. In the survey, customers are asked if they had any incident with the mobile service provider, table 2.2 contains complaints classified by operator. Customers are asked about seven types of complaints: delay in establishing the service, coverage problems, incorrect billing, incorrect billing for services not used, breach of contract or commercial offer, difficulty in cancelling the service and difficulty in obtaining the required information.

Table 2.2. Complaints by operator

		ORANGE		VODAFONE		MOVISTAR		YOIGO		VMO	
		Freq.	**%**	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**%**
COMPLAINTS	Delay in establishing the service	14	1.79	16	1.27	25	1.25	0	0	0	0
	Coverage problems	205	26.28	259	20.43	321	16.03	10	18.87	12	17.39
	Incorrect billing	51	6.61	64	5.16	97	4.96	1	1.89	1	1.45
	Incorrect billing for services not used	46	5.98	71	5.70	93	4.73	0	0	2	2.86
	Breach of contract or commercial offer	38	4.92	40	3.19	65	3.29	1	1.89	0	0
	Difficulty in cancelling the service	30	3.90	32	2.58	53	2.71	4	7.55	0	0
	Difficulty in obtaining the required information	71	9.17	78	6.21	133	6.67	4	7.55	3	4.23

Note: Complaints are dummy variables that take value 1 if there is a complaint and takes 0 if not. That is why the sum of all complaints does not add up to 100%.

At the time of the survey the market was served by Movistar, Vodafone, Orange, Yoigo and Vitual Mobile Operator companies. Movistar, Vodafone and Orange have complaints about delay in establishing the service. Orange is the one which has more percentage of complaints, but only 1.79% of them are complaints about delay in establishing the service, while Vodafone and Movistar have 1.27% and 1.25%, respectively.

The most frequent kind of complaint is about Coverage Problems. The company with the highest percentage of complaints about Coverage Problems is Orange with 26.28% of complaints received being of this kind. Following in a decreasing degree of incidence of the total amount of complaints are Vodafone (20.43%), Yoigo (18.87%), and Virtual Mobile Operator (17.39%). Lastly, Movistar has the lowest percentage of complaints about Coverage Problems, being that of 16.03%.

About incorrect billing, Orange is the operator with a higher rate of complaints (6.61%), while the operators with less complaint about incorrect billing are VMOs (1.45%).

Another type of complaints is incorrect billing, about services not used. The operator with the highest percentage of complaints is Orange (5.98%). Yoigo does not have any complaints.

VMOs do not have any complaints about breach of contract and difficulty in cancelling the service. Orange is the operator that has most complaints about breach of contract (4.92%) and complaints about

difficulty in obtaining the required information (9.17%). Yoigo has the most complaints about difficulty in cancelling the service (7.55%).

Table 2.3. Complaints resolved directly with the operator

	Yes	%	No	%
ORANGE	131	17.08	636	82.92
VODAFONE	194	15.54	1054	84.46
VMO	8	15.09	45	84.91
MOVISTAR	270	13.58	1718	86.42
YOIGO	9	12.68	62	87.32
Total	612	12.56	4261	87.44

However, complaints are not resolved by the operators in all cases. Table 2.3 contains the complaints resolved or not, by operator. The first columns show the number and the percentage of resolved complaints, the average of resolved complaints is 12.56% that is not a good point for any customer or operator.

More than 80% of complaints are not resolved by the operator, and the consumer has to use other ways to settle the complaint.

Yoigo and Movistar have the highest percentage of complaints not resolved by the operator (87.32% and 86.42%, respectively).

Table 2.4. Main forms of contact with operator by customers

	MOVISTAR		VODAFONE		ORANGE		YOIGO		VMO	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Calling Customer Care	439	78.96	301	70.49	212	75.18	22	62.86	9	52.94
By website	10	1.8	18	4.22	8	2.84	2	5.71	2	11.76
By mail or fax	0	0	0	0	2	0.71	0	0	0	0
For several of the above methods	8	1.44	5	1.17	4	1.42	1	2.86	0	0
Others	99	17.81	103	24.12	56	19.86	10	28.57	6	35.29

There are different ways to file a complaint: by website, by mail or fax… but the main way is calling customer care (over 70%). So it might be important for operators that their telephone customer care service is up to high quality standards.

For Movistar almost 79% of complaints come through calls to the customer care service. 75% of complaints of Orange are received by its customer care service. Vodafone receives 70% of its complaints through customer care. Almost 63% of complaints of Yoigo come from calls to the customer care service. And, almost 53% of complaints of VMOs are received through calls to the customer care service.

Table 2.5 contains a demographic profile of the respondents to the survey. The data is representative nationwide by gender, age, and major telecommunications carriers, thus making them appropriate for the analysis. The respective market shares by operator are Movistar (48.03%), Vodafone (30.34%), Orange (18.69%), Yoigo (1.69%), and virtual mobile operators, VMOs (1.26%).

Table 2.5. Demographic profile of respondents and descriptive statistics

		Frequency	Percent
GENDER	Female	2,107	49.59
	Male	2,142	50.41
AGE	18-24	462	10.87
	25-34	1,008	23.72
	35-44	955	22.48
	45-54	735	17.30
	55-64	534	12.57
	65-74	368	8.66
	> 75	187	4.40
LEVEL OF STUDIES	No Studies	113	2.67
	Primary	2,226	52.60
	High School	1,059	25.02
	College	834	19.71
CITIZENSHIP	Spanish	3,778	89.31
	Dual (Spanish+Other)	92	2.17
	Foreign	360	8.51
CARRIER	Movistar	2,020	48.03
	Vodafone	1,276	30.34
	Orange	786	18.69
	Virtual Mobile Operator	53	1.26
	Yoigo	71	1.69
COMPLAINTS*	Delay in establishing the service	56	1.33
	Coverage problems	812	19.26
	Incorrect billing	214	5.18
	Incorrect billing for services not used	212	5.11
	Breach of contract or commercial offer	145	3.48
	Difficulty in cancelling the service	120	2.91
	Difficulty in obtaining the required information	291	6.95

* Complaints are dummy variables that take value 1 if there is a complaint and takes 0 if not. That is why the sum of all complaints does not add up to 100%.

Table 2.6. Correlation satisfaction overall and complaints

	Satisfaction overall	Delay in establishing the service	Coverage problems	Incorrect billing	Incorrect billing for services not used	Breach of contract or commercial offer	Difficulty in cancelling the service	Difficulty in obtaining the required information
Satisfaction overall	1.0000							
Delay in establishing the service	-0.0791	1.0000						
Coverage problems	-0.1743	0.0457	1.0000					
Incorrect billing	-0.1859	0.1685	0.1035	1.0000				
Incorrect billing for services not used	-0.1833	0.1284	0.1081	0.5393	1.0000			
Breach of contract or commercial offer	-0.1679	0.1508	0.0844	0.2944	0.3614	1.0000		
Difficulty in cancelling the service	-0.1724	0.1568	0.0913	0.2399	0.3060	0.2770	1.0000	
Difficulty in obtaining the required information	-0.2204	0.1474	0.1236	0.3001	0.2740	0.2823	0.3518	1.0000

There is an alternative source of data for quality of telecommunications services from the Ministerio de Industria (2012), but its reliability is limited since it is elaborated with self-reported data by the operators, and it refers to the technical quality of the supply side rather than the quality perceived by the demand side (specifically individual consumers).

The correlation matrix of complaints and satisfaction, in table 2.6, shows that the different types of complaints do not have sizeable linear correlations among themselves while they exhibit negative correlations

with satisfaction overall. This indicates that the different types of complaints measure distinct aspects of dissatisfaction.

3. Empirical models for customer satisfaction and complaints

This section presents the results of the different models of customer satisfaction and complaints. The empirical analysis is based on ACSI and ECSI models (see Gijón, Garín-Muñoz, Pérez-Amaral, & López-Zorzano, 2013). Here, in order to approximate the relationships, general linear models are specified.

3.1. Overall satisfaction and different types of complaints

All models are estimated using STATA 12. Then the White's test for heteroskedasticity is performed. Upon detecting heteroskedasticity, the covariance matrix of the estimated coefficients is estimated using the Eicker-White (Eicker, 1967; and White, 1980) heteroskedasticity consistent covariance matrix estimator. The empirical methodology is in the same spirit as in Gijón et al. (2013) and Garín-Muñoz, Gijón, Pérez-Amaral, and López (2013).

Wooldridge (2010) recommends to start with a linear model and, if necessary, continue with and ordered logit/probit model. In this paper, the models have been estimated first by ordinary least squares (OLS),

and then by ordered probit and logit models, as show in table 2.A1 of the appendix. Similar estimates to the linear model are obtained, in terms of signs and significance of coefficients.

The first model relates to the overall satisfaction to each type of complaint. The satisfaction scale ranged between one and 10, where one corresponds to the minimum satisfaction and 10 to the maximum.

The complaints variables are dummies that take the value one if at least one specific complaint has been filed in the last 12 months and zero otherwise.

The second column of table 2.7 shows that all the coefficients of complaints are negative and significant (except the one about the delay in establishing the service that is insignificant). As it was expected, if you file a complaint the satisfaction with your mobile operator is worse than if you do not have any complaint. Moreover it is difficult to obtain the required information about the effect of each complaint on overall satisfaction.

The third column of table 2.7 contains the estimates of a generalization of the previous equation, including sociodemographic variables. This third column shows that gender, education and nationality are significant and negative. So if you are a man, you are less satisfied with your operator. The same happens if you have a higher education level or if you are Spanish. Again, difficulty in obtaining the required information is the complaint which has the higher impact on the overall

satisfaction (it can be observed that the same result occurs in the fourth and fifth columns).

The fourth column of table 2.7 is another variation of the second column, but now this estimation includes carriers: Vodafone, Orange, Yoigo and VMO (Movistar is used as a basis for comparison because it is the former incumbent). There are no major changes with the complaints coefficients. That estimation shows that Vodafone and Yoigo are significant and positive. So if you have a contract with these operators you are more satisfied than if you have a contract with Movistar, Orange or a VMO.

Finally, the fifth column of table 2.7 includes sociodemographic variables and operators. Spaniards tend to be less satisfied than foreign nationals by -0.228 points in a scale between one to 10. Males tend to be less satisfied than females by -0.129 points. The overall satisfaction is significantly affected by coverage problems -0.563, incorrect billing for services not used -0.467, incorrect billing -0.619, breach of contract or commercial offer -0.574, difficulty in cancelling the service -0.659, and difficulty in obtaining the required information -0.927.

The bottom of the table contains the number of observations, the coefficient of determination, and the F test of joint significance which is highly significant. Notice that the number of observations differ by columns according to differences in the number of missing values of each variable.

Table 2.7. Overall satisfaction and complaints

		With sociodemographics	With operators	With operators and sociodemographics
	Overall satisfaction	Overall satisfaction	Overall satisfaction	Overall satisfaction
Delay in establishing the service	-.262 (.247)	-.233 (.262)	-.192 (.241)	-.150 (.255)
Coverage problems	-.609*** (.074)	-.578*** (.077)	-.603*** (.074)	-.563*** (.077)
Incorrect billing	-.572*** (.183)	-.617*** (.190)	-.576*** (.182)	-.619*** (.190)
Incorrect billing for services not used	-.440** (.181)	-.452** (.189)	-.462** (.180)	-.467** (.188)
Breach of contract or commercial offer	-.606*** (.230)	-.607** (.240)	-.572** (.229)	-.574** (.238)
Difficulty in cancelling the service	-.688*** (.237)	-.683*** (.246)	-.652*** (.237)	-.659*** (.247)
Difficulty in obtaining the required information	-.906*** (.150)	-.931*** (.157)	-.908*** (.150)	-.927*** (.158)
Age		.0007 (.002)		.002 (.002)
Male		-.116** (.057)		-.129** (.057)
Spaniard		-.238** (.094)		-.228** (.093)
Education		-.011* (.006)		-.012* (.006)
Expenditure		.0005 (.0008)		.0005 (.0008)
Vodafone			.121* (.063)	.161** (0.66)
Orange			-.024 (.074)	.006 (.078)
Yoigo			.526** (.219)	.547** (.224)
VMO			.032 (.252)	.330 (.241)
Constant	7.454*** (.030)	7.840*** (.165)	7.410*** (.040)	7.748*** (.172)
F (p-value)	39.19 (0.0000)	23.16 (0.0000)	25.53 (0.0000)	18.12 (0.0000)
White test, χ^2 (p-value)	119.35 (0.0000)	129.69 (0.0000)	120.90 (0.0000)	129.92 (0.0000)
R^2	0.0964	0.1064	0.0979	0.1090
n	3954	3600	3915	3577
Max. VIF	1.56	1.58	1.56	1.59

Notes: In parenthesis robust std. error. * Significant at 10%, ** significant at 5% and *** significant at 1%. Heteroskedasticity consistent covariance matrix estimates (Eicker-White) are used.

We have also used the variance inflation factor (VIF) to assess multicollinearity. While some approximate multicollinearity does exist, VIF scores of less than 10 suggest that it will not significantly influence the efficiency and stability of the parameter estimates (Belsley, Kuh, & Welsch, 1980).

3.2. Satisfaction with Customer Care

In table 2.8 the dependent variable is the satisfaction with customer care. All the coefficients of the operators are significant, except VMO.

The satisfaction with customer care is significantly affected by difficulty in obtaining the required information -2.103, incorrect billing -0.696, difficulty in cancelling the service -0.545, and breach of contract or commercial offer -0.447.

An important point is that the coefficient of complaints about difficulty in obtaining the required information is -2.103 and significant. Note that satisfaction takes values from one to 10. Therefore having a complaint about obtaining the required information has a large and negative impact. If you file that complaint, you are two points less satisfied with your operator customer care.

The second column of table 2.8 also shows that gender, education and nationality are significant and negative; age and expenditure are significant too, but positive. So if you are a man, have a higher level of education or are Spanish, you are less satisfied with your service.

Table 2.8. Estimations of different satisfactions and complaints

	Satisfaction with customer care	Satisfaction with coverage
Coverage problems		-2.362*** (.102)
Incorrect billing	-.696*** (.212)	
Breach of contract or commercial offer	-.447* (.254)	
Difficulty in cancelling the service	-.545** (.237)	
Difficulty in obtaining the required information	-2.103*** (.191)	
Customer contacted the company to resolve the issue	-.627*** (.138)	
Complaint still not resolved		-.288*** (.103)
Age	.006** (.003)	-.003 (.002)
Male	-.184** (.072)	.050 (.059)
Spaniard	-.367*** (.114)	-.222** (.092)
Education	-.014* (.008)	-.003 (.006)
Expenditure	.002* (.0009)	-.0008 (.001)
Vodafone	.352*** (.084)	-.275*** (.069)
Orange	.212** (.099)	-.531*** (.083)
Yoigo	.845*** (.236)	-.075 (.211)
VMO	.305 (.281)	-.547* (.281)
Constant	6.963*** (.215)	8.372*** (.202)
Number of outliers	2	16
F (p-value)	41.74 (0.0000)	331.38 (0.0000)
White test, χ^2 (p-value)	54.56 (0.0000)	113.40 (0.0000)
R^2	0.1776	0.2401
n	3109	3631
Max. VIF	1.69	1.26

Notes: In parenthesis robust std. error. * Significant at 10%, ** significant at 5% and *** significant at 1%. Heteroskedasticity consistent covariance matrix estimates (Eicker-White) are used.

3.3. Satisfaction with Coverage

The third column of table 2.8 shows another equation in which the dependent variable is the satisfaction with coverage. All the coefficients of operators are significant and negative, except Yoigo which is not significant.

It is reasonable to hypothesize that satisfaction with coverage will be related to complaints of coverage problems. In our case, if you have a complaint about coverage problems, the satisfaction will be 2.362 points lower than if you did not have any coverage complaint at all.

The variable complaint still not resolved, is a dummy that takes the value one if the complaint was not resolved in the last 12 month and zero otherwise. So, if the complaint is still not resolved, the satisfaction with coverage is 0.288 points lower than if the complaint is resolved.

At the bottom of the column is the number of observations (3631), the coefficient of determination (0.24), and the F test of joint significance (331.38) which is highly significant. The variance covariance matrix of the estimated coefficients is estimated using the Eicker-White (White, 1980) estimator.

4. Conclusions

Having established a link between complaints and the customer satisfaction of the mobile companies, we can conclude that are different ways to improve their satisfaction and reduce their complaints.

From descriptive analysis of the survey, we can conclude that:

- There are complaints that have not been resolved directly with the operator, so the customer has to use other ways to try to resolve the complaint. This is the reason why a mechanism or appropriate regulatory action is required for the resolution of complaints, as suggested in López et al. (2013).

- The main way to file a complaint by consumers is through customer service. However, Gijon et al. (2013) find that the mean customer care satisfaction is only 6.5, which suggests that more attention could be paid to this service by the operators.

- Difficulty in obtaining information by the customer is the most usual complaint and one of the most negative and significant ones. This problem affects directly the satisfaction with customer care, so operators should take care of it.

- Orange is the operator which has the highest percentage of complaints in all types of complaints of all the operators, except the one about difficulty in cancelling the service in which Yoigo has the highest complaint rate.

- Movistar is the operator which has less percentage of complaints, but in Gijon et al. (2013) Movistar is the operator which has less overall satisfaction.

- Satisfaction is negatively related to the different types of complaints, as expected.

- Overall Satisfaction is negatively related to male, spaniard and education.

- The operator effect is an important determinant for consumer satisfaction.

- The operator effect of Movistar is negative for Overall Satisfaction and Customer Care.

The results suggest that the Spanish mobile operators have not been able to deal adequately with the complaints and that faced with the challenge of complaints, they have missed the opportunity to turn them into a competitive advantage rather than a punishment (expression of dissatisfaction) from their customers.

- They have failed to turn an expression of dissatisfaction into a signal of where to improve.

- They have failed to convert the challenge of complaints into an indication about where to improve.

- Failed to convert the opportunity of handling appropriately the complaint of a dissatisfaction customer and turn him into a loyal customer.

One limitation of the study is that the 2009 data may seem outdated, but it must be noted that the purpose of this paper is to study relationships that are expected to be stable over time.

Another limitation of the study, due to the type of survey data, is the fact that the dynamics of an individual's satisfaction cannot be studied along time. Churning is a factor that may be worth studying using panel data when available.

While the results are specific to Spain, it would be interesting to analyze data from other countries, since it is possible that similar results hold elsewhere.

This study suggests the need for further research on this and related topics. A future research agenda would include a study on the determinants of the complaints by consumers of mobile operators in Spain and continuing with related research analyzing on mobile telecommunications consumer protection in Spain in comparison with other European countries. A third topic is the study of the satisfaction indices reported by SMREC (2013) in order to analyze the reasons behind the significant decline in the satisfaction 2011 and why there was such a large gap between Spain and the rest of the Europe in 2011 and 2012.

Appendix

Table 2.A1. OLS, ordered Probit and ordered Logit

	OLS	Ordered Probit	Ordered Logit
	Overall satisfaction	Overall satisfaction	Overall satisfaction
Delay in establishing the service	-.150 (.255)	-.133 (.154)	-.198 (.260)
Coverage problems	-.563*** (.077)	-.346*** (.044)	-.610*** (.078)
Incorrect billing	-.619*** (.190)	-.354*** (.094)	-.614*** (.173)
Incorrect billing for services not used	-.467** (.188)	-.265*** (.097)	-.566*** (.173)
Breach of contract or commercial offer	-.574** (.238)	-.270*** (.104)	-.381** (.191)
Difficulty in cancelling the service	-.659*** (.247)	-.324*** (.115)	-.615*** (.208)
Difficulty in obtaining the required information	-.927*** (.158)	-.504*** (.076)	-.903*** (.138)
Age	.002 (.002)	.001 (.001)	.002 (.002)
Male	-.129** (.057)	-.079** (.034)	-.115* (.060)
Spaniard	-.228** (.093)	-.148*** (.055)	-.266*** (.097)
Education	-.012* (.006)	-.008** (.004)	-.014** (.006)
Expenditure	.0005 (.0008)	.0003 (.0005)	.0007 (.0008)
Vodafone	.161** (0.66)	.098** (.040)	.179** (.070)
Orange	.006 (.078)	-.002 (.047)	.018 (.081)
Yoigo	.547** (.224)	.357*** (.133)	.767*** (.232)
VMO	.330 (.241)	.199 (.156)	.290 (.263)
Constant	7.748*** (.172)		
F (p-value)	18.12 (0.0000)		
White test, χ^2 (p-value)	129.92 (0.0000)		
χ^2 (p-value)		356.78 (0.0000)	346.14 (0.0000)
R^2	0.1090	0.0261	0.0253
n	3577	3577	3577

Notes: In parenthesis robust std. error. * Significant at 10%, ** significant at 5% and *** significant at 1%. Heteroskedasticity consistent covariance matrix estimates (Eicker-White) are used in the OLS regressions.

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Capítulo 3 – Chapter 3: The value of personal information online: results from three stated preference discrete choice experiments in the UK[2]

Abstract

This paper proposes the application of a widely used approach, known as stated preference discrete choice experiments, to estimate the value of personal information in three real-life contexts and situations. The paper develops three experiments describing hypothetical situations in which respondents considered varying aspects of their personal information (e.g. storage, sharing with third parties) when (a) purchasing online a product, (b) a service or (c) conducting pure search online. The survey was carried out with sample quotas pre-specified in order to match the profile of the Internet-user population in the UK with respect to gender, age group, geographical area of residence and personal annual income. The results from the experiment provide new insights in the value and influence of attributes of personal information when conducting online transactions. In particular, main results show that there was little interest by respondents to pay in order to introduce control over their personal data, that the extend of sharing of personal information with third parties was seen the most important aspect when choosing online retailers and search engines, and that an unspecified duration of data storage was received as badly as the data storage beyond several years for online retailers and worse than shorter durations.

[2] Excerpted from *The value of personal information online: results from three stated preference discrete choice experiments in the UK* by Potoglou, D.; Patil, S.; Gijón, C.; Palacios, J-F.; & Feijóo, C., © 2013. Used with permission from Association for Information Systems, Atlanta, GA; 404-413-7444; www.aisnet.org. All rights reserved.

Resumen

En este trabajo se propone la aplicación de un enfoque ampliamente utilizado, conocido como preferencia declarada experimentos de elección discreta, para estimar el valor de la información personal en tres contextos de la vida real y situaciones. El trabajo desarrolla tres experimentos que describen situaciones hipotéticas en las que los encuestados consideran que varían los aspectos de su información personal (por ejemplo, almacenamiento, compartiendo con terceros) cuando (a) la compra en línea de un producto, (b) un servicio o (c) la realización de la búsqueda en línea pura. La encuesta se llevó a cabo con las cuotas de la muestra pre- especificados a fin de que coincida con el perfil de la población de usuarios de Internet en el Reino Unido en cuanto a género, grupo de edad, zona geográfica de residencia y el ingreso anual personal. Los resultados del experimento proporcionan nuevos conocimientos en el valor y la influencia de los atributos de la información personal cuando realizan transacciones en línea. En particular, los principales resultados muestran que hubo poco interés por los encuestados para pagar a fin de introducir el control de sus datos personales, que la extensión de compartir información personal con terceros se observó el aspecto más importante al momento de elegir los minoristas en línea y motores de búsqueda, y que una duración no especificada de almacenamiento de datos se recibió tan mal como el almacenamiento de datos más allá de varios años para que los minoristas en línea y peor que una duración más corta.

1. Introduction

All types of electronic media are increasingly interconnecting people among them and with both the virtual and physical worlds. While we exchange and access information using these systems, data records are collected on who we are, where we are, what we do, and how we do it. With data storage capacity increasing and becoming more affordable, computational power increasing geometrically and improved broadband penetration and affordability, the collection and analysis of these data is opening a wealth of innovations related with personalised services and applications. In fact, while companies have always collected customer data and used them to create value, this is now realised in a larger scale and much cheaper and faster than ever before. However, while personalization of online services provide value to customers -an Internet report (Bughin, 2011) estimated this value in US and selected EU countries at €100 billion for 2010-, there are also demonstrable users' concerns about possible privacy abuse of their personal data (Cooper, 2008) as well as annoyance with the advertising interruptions (Spaulding, 2010). Indeed, with commercial and technical developments in this area relatively fragmented, more research on the economics of personal information is needed in spite of initial works by the OECD and the WEF (WEF, 2011). In particular, policymakers face considerable challenges when attempting to regulate personal data in online markets; not only are the markets complex with many new emerging stakeholders and services, but the challenges multiply as the data flows increase and as the collection of personal information in business-to-consumer

transactions and the respect of consumers' preferences are two fundamentally competing goals. In addition, consumers are not aware in general of the further usages of their personal information beyond their immediate service provider and they would need to be better informed of likely market initiatives. They also feel threatened by the unbounded use of personal information by third parties irrespective of contextual integrity (Nissenbaum, 2010). Moreover, society as a whole needs information on whether or not industry is gaining from the existing information asymmetry or in what business models can they rely to achieve improved protection and/or satisfaction.

Precisely, this paper examines what is the economic value of the personal information component in different transactions and use cases based on an experimental design. It delimits analysis to ecommerce sites, recommender systems and search engines. These sectors have been chosen since they comprise a relevant part of the daily online activities of users, and they are based on well-defined transactions where personal information is exchanged. Experimental design is needed as there is no direct market evidence on how individual consumers respond to nuances in personal information usage by providers. In particular, stated preference (SP) methods allow examination of such hypothetical situations to compensate for the absence of real market behaviour.

Following this same rationale, in recent years several experimental studies have been conducted attempting to quantify individual valuations of personal data in diverse contexts. Initial research was mainly aimed at

analysing privacy issues. For instance Hann et al. (2002) implemented a ranking-conjoint experiment on different websites to attach a monetary value to privacy issues, such as mistakes on personal information treatment, improper access or secondary use of information, concluding that providers need to offer substantial monetary incentives to overcome individual concerns. Next strand of research focused on behavioural patterns regarding the type of information disclosed as well as the environment where the transaction took place. For example Huberman et al. (2005) used reverse second-price auctions for personal data on age and weight. These authors concluded that the willingness to accept was related to self-perception factors, in particular individuals closer to the average were more inclined to reveal personal information than individuals who perceived themselves to be far from the average. A similar approach was followed by Danezis et al. (2005) on location, concluding that respondents tended to consider more valuable their data for commercial than for academic usage. Cvrcek et al. (2006) found that extending storage of location from one month to a year caused a twofold increase in the median bids. These initial experiments provided relevant hints at factors influencing user perspective but only looked into partial aspects of personal information from a privacy perspective, and did not follow any utility theory to arrive at economic valuations. The other main type of existing practical research on the valuation of personal information is based on laboratory settings where personal information is a key part of an economic transaction on a real good or service. Two relevant examples were carried out by Jentzsch et al. (2012) and

Beresford et al. (2010). Both works propose respondents to choose between two online retailers with different approaches to personal information, and both reach similar conclusions about consumers willing to pay to the "privacy-friendly retailer". These experimental settings provide further insights into the processes and motivations embedded in the valuation of personal information, but lack a comprehensive perspective on all the attributes –and their valuation- attached to transactions linked with personal information.

Departing from this previous literature, this paper aims at widening the scope of existing results on the current status of the perceived value in the use of consumers' personal information in online transactions, establishing the specific influence of individual attributes in the valuation of personal information. For this, the experiment described in the paper covers three frequent and relevant usage scenarios, a broader and more granular number of attributes than previous works, and uses a representative sample of Internet users in the UK to reach conclusions as general and valid as possible. Although the experiment includes information on these variables, correlation with online behaviour and influence of socio-demographics were postponed for further research.

The paper is organized as follows. After the background information and brief review of this section, the next section describes in detail the methodology of the stated-preference-discrete-choice experiment used in the survey. Section 3 explains the design of the experiment, and section 4 the survey implementation and the preliminary data analysis. From

there, the econometric analysis and some of the main results are presented. The paper closes with the discussion of results.

2. The stated-preference-discrete-choice-experiment methodology

The stated-preference-discrete-choice-experiment (SPDCE) is a multi-attribute survey-based approach for eliciting consumer's choices for non-market goods, services or situations in a hypothetical setting (Louviere, Hensher, & Swait, 2000). Their main purpose of conducting is to identify the independent influence of attributes in the choices made by a sample of survey participants and their valuation of these attributes.

The attractiveness of the SPDCE method lies in its capacity to account for multi-attribute issues, explore non-existing alternatives, and largely avoid the problem of multicollinearity, a common issue when modelling observed (actual) individual behaviour (Hensher, Rose, & Greene, 2005). Throughout almost 30 years of research, the SPDCE approach has found wide applicability in variety of subject areas including transport (e.g. Iraguen & Ortuzar, 2004), environmental valuation (e.g. Birol, Karousakis, & Koundouri, 2006), healthcare (e.g. Ryan, Bate, Eastmond, & Ludbrook, 2001) and marketing (e.g. Allenby, Shively, Yang, & Garratt, 2004). SPDCE involves presenting respondents with sets of two or more hypothetical alternatives and asking them to choose the one they would prefer the most. The different alternatives in a choice situation are

defined as 'packages' comprised of a set of relevant attributes (characteristics) constructed by researchers in a preparatory design stage of the survey. Attributes take a range of values (levels) to form these alternatives. Qualitative analysis including literature reviews, focus-groups and cognitive testing, is particularly appropriate in defining the relevant attributes and levels to be used in the experiment (Kløjgaard, Bech, & Søgaard, 2012). The combinations of attribute levels to form the sets of alternative options are constructed using principles of statistical experimental design, including optimal and efficient designs (Bliemer & Rose, 2009; Hensher, et al., 2005; Huber & Swerina, 1996).

Using choice-based experiments ('pick-one' task) allows the analyst to both design the experiments (if efficient designs are used)[3] and conduct subsequent analysis using discrete-choice analysis which is grounded on a rigorous theory, the Random Utility Theory (RUT) (Louviere & Woodworth, 1983). Under RUT, for each alternative-option *i* an individual *n* assigns a utility U_{in}, which contains an observable (deterministic) part V_{in} and a random (unobservable) part ε_{in} (McFadden, 1974):

$$U_{in} = V_{in} + \varepsilon_{in} = \sum_i \beta_i X_{in} + \sum_p \gamma_p Z_{pn} + \varepsilon_{in} \quad [1]$$

The observable part of the utility V_{in} is a linear-in parameters function of attribute levels (characteristics) (X_{in}) describing the alternative and

[3] Recent advancements in the design of SPDCE recommend the generation of alternatives using efficiency criteria (reduction of the asymptotic variance-covariance standard errors) rather than orthogonality across the attributes of the alternatives. Efficient designs will generally results in designs that either improve the reliability of the parameters estimated from SPDCE data at a fixed sample size or reduce the sample size required to produce a fixed level of reliability in the parameter estimates with a given experimental design (Huber & Swerina, 1996; adapted from Bliemer & Rose, 2009).

individual characteristics (Z_{pn}), and β_i and γ_p are coefficient estimates for each attribute level *X* and coefficients representing the (potential) influence of personal characteristics in the choosing alternative *i*, respectively.

Under RUT, it is assumed that a respondent *n* will consider the available option described by attribute levels *X* and will choose the alternative with the highest utility. Given that the above formulation of utility includes a stochastic component, it is only possible to describe the probability of choosing alternative *i* over another alternative *k* as:

$$Prob\ (i\ is\ chosen) = prob\ \{V_i + \varepsilon_i > V_k + \varepsilon_k;\ \forall k \in C\} = prob\{V_i - V_k > \varepsilon_k - \varepsilon_i) \quad [2]$$

where *C* is the set of all possible alternatives. Assuming a type I extreme value distribution for the error terms and independence between the alternative options, the probability of choosing alternative *i* takes the form of the conditional logit model (McFadden, 1974)[4]:

$$Prob\{i\ is\ chosen\} = \frac{\exp(\mu V_i)}{\sum_{j \in C}(exp \mu V_j)} \quad [3]$$

where μ is the scale parameter, which for any single sample is assumed to be equal to one.

Collecting the choices of survey respondents across the different sets of alternatives allow the estimation of β and γ parameters and the estimation of the probability that alternative *i* will be chosen among the set of alternatives presented to the respondents. Furthermore, results

[4] Different assumptions about the distribution of the error terms give rise to different modelling structures (e.g. probit, mixed logit).

can be used to derive estimates of consumers' valuation for different aspects of a non-market good or service – i.e., the amount of money they are willing to pay (or willing to accept) to obtain some benefit (or avoid some cost or situation) from a specific action (Louviere et al., 2000).

The above theoretical framework and prior empirical evidence to support the use of SPDCE for elicitation of choices over a set of alternatives composed of different levels is regarded as promising and appropriate approach in understanding individuals' valuations for their personal information and a contribution to the literature in this field. This study is aimed at testing this assertion by developing three discrete choice experiments as described in the following sections.

3. Design of SPDCE to estimate the value of personal information

This study focused on three hypothetical scenarios in which respondents' valuation for their personal information was examined: purchase of a product online (Experiment 1), (b) purchase of a service online (Experiment 2) and (c) conducting pure search using a search engine (Experiment 3).

The design of the SPDCE questionnaire followed three stages (Bliemer & Rose, 2009): (1) qualitative research, (2) model specification and (3) experimental design. As part of the first stage, we conducted a literature

review (see previous section) and consulted with experts in order to define the choice context, the attributes and attribute levels that would describe the scenarios. The attributes and levels used to describe the alternative options in each of the experiments are listed in tables 3.1 and 3.2.

In Experiments 1 and 2, respondents were asked to imagine that they were about to repeat a recent online purchase of a product and service, respectively, and were offered a choice of three online retailers with varying levels of requirements, treatment and storage of their personal information. These three options included a cost per transaction, negatively correlated with personal data requirements asked by the retailer. The main objective of this design was to make respondents face situations in which they had to make trade-offs between privacy and costs. To complete the choice set respondents were also presented with the possibility of opting-out the experiment and purchasing the good or service from a conventional retailer. An example of a choice situation is shown in figure 3.1.

Table 3.1. Attributes and levels in the purchase of product (Experiment 1) and services (Experiment 2)

Attribute	Levels
Cost per transaction against security costs	(1) Discount £4.00 (2) Discount £2.00 (3) No charge (4) £2.00 (5) £4.00
Additional information saved and linked to your account	(1) Only email (2) Purchase history and email (3) Purchase history, browsing and navigation history and email (4) Purchase history, browsing, navigation history, email and additional personal details
Permission of sharing this additional information with third parties	(1) No (2) Yes
Time your personal information is stored for	(1) 1 year (2) 2 years (3) 5 years (4) Without an explicit temporal limit
Availability of product or service at a conventional store/outlet (Only available in the Conventional store/outlet alternative)	(1) This item can also be easily purchased in your neighbourhood at a conventional retailer (2) This item can also be purchased from a conventional retailer, but it would require from you to make a special effort because of day/hour of purchase, distance to reach the merchant, etc.) (3) This item is not available to purchase from a conventional retailer in your neighbourhood
Additional services offered by the product provider	*Product scenario only (Experiment 1)* (1) None (2) Faster checkout (one-click order) (3) Detailed reviews of products/seller (4) Priority shipping of product at the same price
Additional services offered by the service provider	*Insurance and service scenario only (Experiment 2)* (1) None (2) Faster checkout (one-click order) (3) Legal advice on the phone (4) Detailed reviews of products/seller

Table 3.2. Attributes and levels of attributes in pure search (Experiment 3)

Attribute	Levels	
Monthly charge of using the search engine account	(1) Free (2) £0.50 (3) £1.00 (4) £1.50 (5) £2.00	
IP address (nearby location) stored?	(1) No (2) Yes	[Yes: present additional benefit = search listings highlight results closer to your area or popular in your area]
Search history stored?	(1) No (2) Yes	[Yes: present additional benefit = search listings highlight results which may be more personalised]
Search history linked to your email or IP address?	(1) No (2) Yes	[Yes: present additional benefit = you may receive promotional offers related to your search]
Duration of storage of search history	(1) Not applicable (2) 1 year (3) 2 years (4) No explicit temporal limit	
Advertisement displayed on the search webpage	(1) No (2) Yes	
Additional features associated with the search	(1) None (2) Search listings highlight results closer to your area or popular in your area (3) Search listings highlight results which maybe more personalised (4) You may receive promotional offers related to your search	
Treatment of personal information related to your account with the search provider	(1) Nothing is shared with third parties [only presented with non-zero monthly charge] (2) Search history and/or IP address are shared with third parties (3) Email address is shared with third parties (4) Telephone number, and Email address shared with third parties (5) Telephone number, Email address, search history and/ IP address are shared with third parties	

For Experiment 3, the scheme was similar: respondents were presented with a choice of two search engines with varying levels of requirements, treatment and storage of their personal information. Some of the options involved a monthly charge that would be used against the cost for collection, management, storage and processing of users'

personal information so that they could obtain a better experience and targeted service. As in Experiments 1 and 2, respondents could opt-out to select none of the alternatives offered. An example of a choice situation in Experiment 3 is shown in figure 3.2.

The multinomial choice model (MNL) was selected as the most suitable choice model to describe the choice among different options involving varying levels of attributes. In Experiments 1 and 2, the MNL model consisted of five utility functions, one for each of three online retailers, one for the conventional retailer and one for the opt-out alternative which was set equal to zero. Similarly, in Experiment 3, two observed utility-functions described the choice between two different search engines and one utility, fixed at zero, was specified for the opt-out option.

Based on the specification of the above MNL models, the hypothetical choice situations presented to participants were based on the generation of D-optimal design matrices assuming zero priors for unlabelled alternatives (Bliemer & Rose, 2009). The design matrix in all experiments included 60 different choice situations, which were further blocked into 12 blocks so that each respondent was presented with five choice situations for each of the three experiments. The experimental design matrices were generated using the software Ngene (Ngene, 2010).

Figure 3.1. An example of a choice situation in Experiment 1

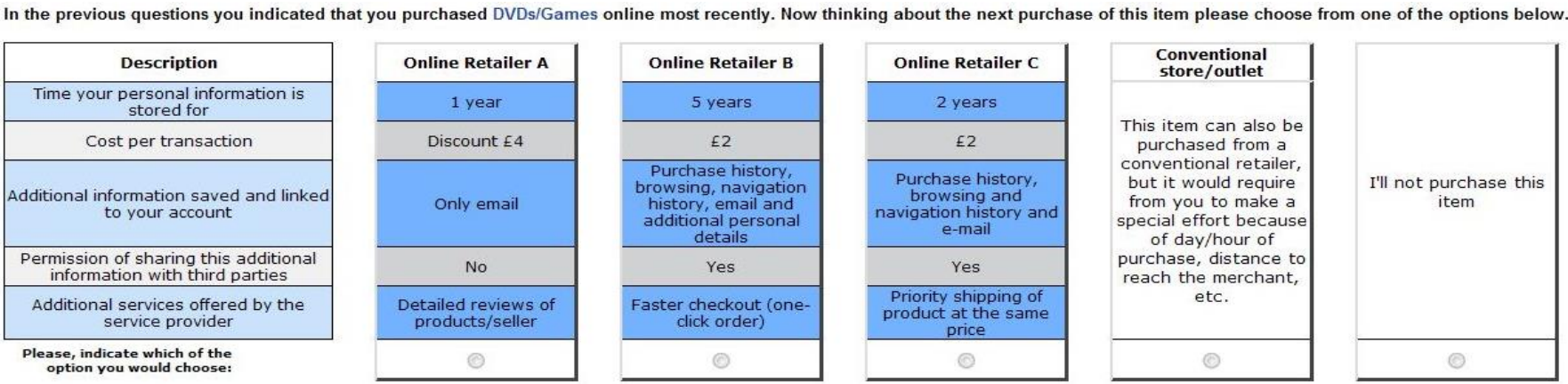
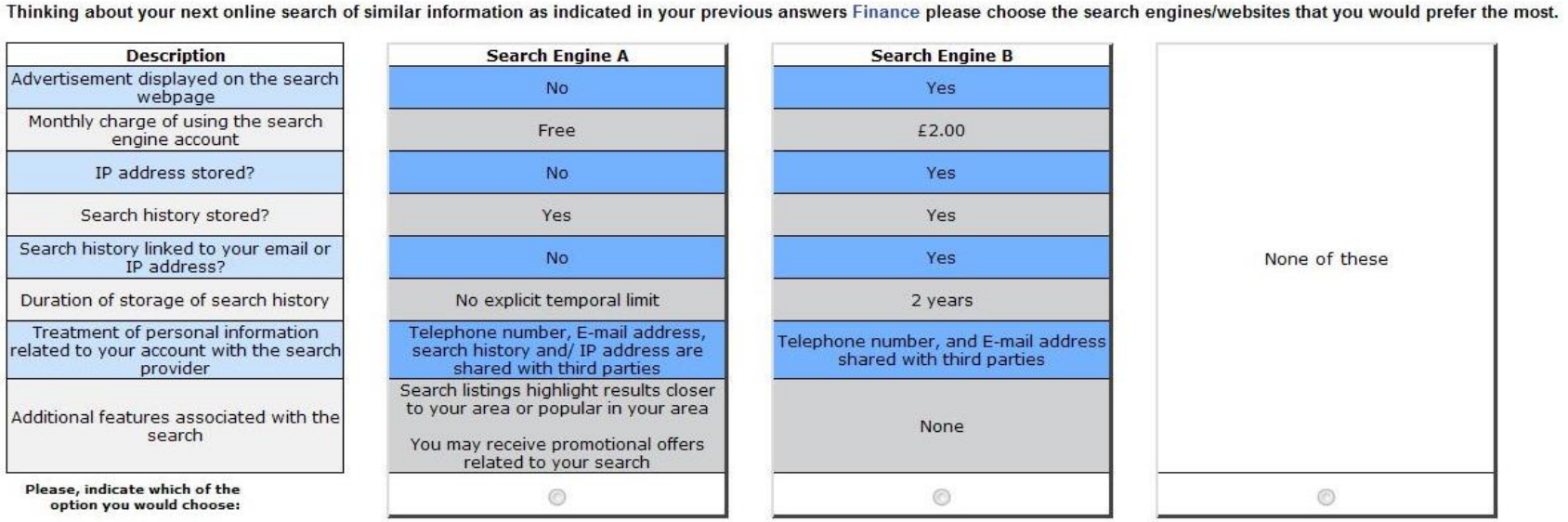


Figure 3.2. An example of a choice situation for pure search (Experiment 3)



4. Survey implementation and preliminary data analysis

The data collection was conducted with participants who were registered with the Internet Panel of 'Research Now' (http://www.researchnow.co.uk), a market research agency with the largest panel of Internet users in the UK. The main survey was conducted 8-10th August 2012. Prior its official release, the survey was modified in accordance with post-survey cognitive questions in a testing phase with 31 participants. A total of 517 respondents completed the survey. Descriptive statistics of the sample and comparisons with the Internet-user population in the UK are shown in table 3.3.

Sample quotas were pre-specified in order to match the profile of the Internet-user population in the UK with respect to gender, age group, geographical area of residence and personal annual income, which were publicly available (Office for National Statistics, 2011). Chi-square tests showed that our sample was representative of the 2001 UK Internet-user population in terms of gender ($\chi^2(1)=1.20$, $p=0.274$), age ($\chi^2(6)=5.33$, $p=0.502$) and geographic region ($\chi^2(11)=9.808$, $p=0.547$). On the other hand, the income-group proportions between our sample and the 2011 UK Internet-user population were significantly different ($\chi^2(11)=47.462$, $p=0.001$), mainly because of the large proportion of Internet-users for whom their annual personal income was unknown (20.9% vs. 9.7% in our survey).

Table 3.3. Sample characteristics vs. the 2011 UK online-user population

Variable	Sample (%)	Internet users in UK (2011 Q4, %)	Variable	Sample (%)	Internet users in UK (2011 Q4, %)
Gender (female)	52.0	49.6	*Region*		
Age group			East of England	10.1	7.2
18-24	13.9	17.1	East Midlands	7.2	9.5
25-34	21.5	19.6	London	12.8	13.3
35-44	19.3	19.5	North East	3.7	4.0
45-54	18.4	18.8	North West	11.6	11.0
55-64	15.9	14.0	Northern Ireland	2.3	2.5
65-74	7.9	7.9	Scotland	8.5	8.3
75 and over	3.1	3.2	South East	13.7	14.1
			South West	9.3	8.7
Annual individual income			Wales	4.5	4.7
Less than £10,399	27.8	20.9	West Midlands	8.3	8.3
£10,400 - £15,599	14.1	15.2	Yorkshire / Humberside	8.1	8.4
£15,600 - £20,799	12.6	15.9			
£20,800 - £25,999	9.3	12.9	*Occupational status*		
£26,000 - £31,199	6.6	10.4	Working full time	41.0	
£31,200 - £36,399	6.6	7.3	Working part time	17.2	
£36,400 - £41,599	4.1	4.6	Student	7.2	
£41,600 - £46,799	2.5	3.8	Retired	16.1	
£46,800 - £51,999	2.7	2.7	Not in paid work because of long term illness or disability	7.0	
£52,000 - £77,999	2.9	4.1	Seeking work	5.8	
£78,000 - £103,999	1.2	1.8	Other	5.8	
£104,000 or higher	0.0	0.3			
Not reported	9.7	20.9			

The SPDCE data were first assessed for accuracy and consistency. Respondents who had never bought any product or service online were not shown the corresponding experiments for product and service purchase respectively. This could create a bias in spite of the representativeness of the sample as it is possible -for excluded users- that disclosing personal information was one of the reasons for not using these services online. If this were the case, the results of the experiment would show lower values of each attribute level. Also, respondents who were not able to make comparisons between the choices in the experiments were excluded from further analysis. Finally, respondents who consistently chose the same retailer –i.e., always retailer A, B or C–

were excluded from further analysis as non-traders (Hess, Rose, & Polak, 2010). Table 3.4 shows the number of participants whose choices were analysed.

Table 3.4. Number of respondents excluded from the discrete choice analysis

Question	Experiment 1	Experiment 2	Experiment 3
Number of participants who had never not bought any product or service on the Internet	15	69	0
Number of participants not able to make comparisons in the experiment	42	44	43
Non traders (participants who always choose the same retailer/search engine across the 5 choices)	28	37	6
Total number of observations available for modelling	432	367	468

5. Econometric approach and results

We used error-component-multinomial-logit (mixed logit) models to analyse the SPDCE data in order to account for the correlation between the five observations that came from the same respondent in each experiment. The specification of the utility *U* of a participant *j* choosing an online retailer *i* in a choice exercise *t* in Experiments 1 and 2 was as follows:

$$U_{ijt} = constant_i + \beta_1 Cost + \beta_2 Additional\ Inf. + \beta_3 Inf.Sharing + \beta_4 Storage\ Time + \beta_5\ Additional\ Services + \zeta_j + \varepsilon_{ijt} \quad [4]$$

In Experiment 3, the utility of a participant *j* choosing search engine *i* in a choice exercise *t* was as follows:

$$U_{ijt} =$$

$$const_i + \beta_6 Monthly\ Charge + \beta_7 IP\ address\ storage +$$

$$\beta_8 Search\ history\ storage + \beta_9 Search\ history - email\ link +$$

$$\beta_{10}\ Advertisement + \beta_{11} Treatment\ of\ Per.Inf. + \zeta_j + \varepsilon_{ijt} \quad [5]$$

where ζ was the error component following the normal distribution with mean zero and standard deviation σ_ζ, which varied across alternative retailers *i* and respondents *j* and accounted for the correlations between observations obtained from the same respondent. The error component ε followed the Gumbell distribution with mean zero and accounted for differences between respondents *i*, alternatives *j* and choice exercises *t*. The parameters β_1-β_{11} and the constants were estimated using the software BIOGEME (Bierlaire, 2003). These models were estimated maximizing the simulated likelihood calculated using 500 MLHS draws for the error components (Hess, Train, & Polak, 2006). All attributes except *Cost* and *Monthly Charge* were dummy coded.

The estimation results in Experiments 1 and 2 and Experiment 3 are presented in tables 3.5 and 3.6, respectively. In Experiments 1 and 2, respondents were less likely to choose an option that involved *storage and linkage of additional information* other than their email address, which was the reference level. As requirements for additional information to be saved and linked to an individual's account increased respondents were increasingly against those options. However, there was no significant difference when additional personal details were stored along with purchase history, browsing, navigation history and email. Also,

respondents were not in favour of *sharing their personal information with third parties*. Similarly, they were less likely to choose online retailers who would store respondents' personal information for five years or without specifying a temporal limit, relative to the reference level of one year. Interestingly, there was no significant difference between storing respondents' personal information for one and two years. Also, respondents valued equally options which offered storage of personal information for five years and options which offered storage of personal information without temporal limit. On the other hand, they were more likely to select online retailers who would offer some additional benefit such as priority shipping, faster checkout or detailed reviews of the product and seller. Finally, respondents were less likely to purchase the product from a conventional vendor or service provider relative to online retailers or vendors located in the respondents' neighbourhood.

Concerning Experiment 3, the estimated parameters show that respondents were more likely to avoid online retailers in which their *IP address would be stored* or their *search history would be stored and linked to their IP address*. The latter was marginally significant. Similarly, they were more likely to choose options where *their information was not shared with third parties*. Among the different levels of personal information, respondents were more sensitive when the information to be shared included their telephone numbers, email address, search history and IP address than situations when email address and search history and/or IP address were presented separately. Given that respondents were not in favour of storage of their location and search history by the

internet service provider, the linkage between search history and their email or IP address only had marginal influence on their choice for search engine. Finally, display of advertisements during search was not statistically significant.

Table 3.5. Estimation results in Experiments 1 and 2

Attribute	Experiment 1 Product purchase online Coefficient (t-test)	Experiment 2 Service purchase online Coefficient (t-test)
Cost per transaction against security costs	-0.149 (-12.0)	-0.147 (-9.9)
Additional information saved and linked to your account		
Only email	Reference	
Purchase history and email	-0.250 (-3.1)	-0.350 (-4.1)
Purchase history, browsing, navigation history and email	-0.560 (-6.9)	-0.733 (-8.4)
Purchase history, browsing, navigation history, additional personal details and email		
Permission of sharing this additional information with 3rd parties 1 if Yes; 0 if No)	-0.840 (-9.8)	-1.07 (-10.3)
Time your personal information is stored for		
1year	Reference	
2 years	0.0	0.0
5 years	-0.433 (-6.4)	-0.565 (-7.6)
Without an explicit temporal limit		
Additional services for product purchase		
None	Reference	
Priority shipping of product at the same price		
Faster checkout (one-click order)	0.478 (6.1)	N/A
Detailed reviews of products/seller		
Faster checkout (one-click order)		
Legal advice on the phone	N/A	0.340 (4.3)
Detailed reviews of products/seller		
Availability of product or service at a conventional store/outlet		
This item can also be easily purchased in your neighbourhood at a conventional retailer	Reference	
This item can also be purchased from a conventional retailer, but it would require from you to make a special effort (because of day/hour of purchase, distance to reach the merchant, etc.)	-0.692 (-4.0)	-0.897 (-4.7)
Standard deviation σ_ζ	0.817 (13.7)	0.766 (10.7)
No. of observations	2160	1835
No. of individuals	432	367
Log-likelihood, constants only, L(c)	-2924.8	-2308.5
Log-likelihood, constants only, L(final)	-2828.5	-2272.3
Rho-square	0.134	0.152

Table 3.6. Estimation results in Experiment 3

Attribute	Experiment 3. Pure search Coefficient (t-test)
Monthly charge of using the search engine account	-1.71 (-10.1)
IP address (nearby location) stored? (1 if Yes, 0 if No)	-0.375 (-2.5)
Search history stored? (1 if Yes, 0 if No)	-0.366 (-2.1)
Search history linked to your email or IP address? (1 if Yes, 0 if No)	-0.325 (-2.0)
Advertisement displayed on the search webpage (1 if Yes, 0 if No)	-0.235 (-1.6)
Treatment of personal information related to your account with the search	
Nothing is shared with third parties	Reference
Email address is shared with third parties Search history and/or IP address are shared with third parties	-1.03 (-5.9)
Telephone number, email address, search history and IP address are shared with third parties	-1.66 (-8.2)
Standard deviation σ_ε	-1.507 (-20.0)
No. of observations	2340
No. of individuals	468
Log-likelihood, constants only, L(c)	-1873.6
Log-likelihood, constants only, L(final)	-1621.8
Rho-square	0.263

6. Value of personal information

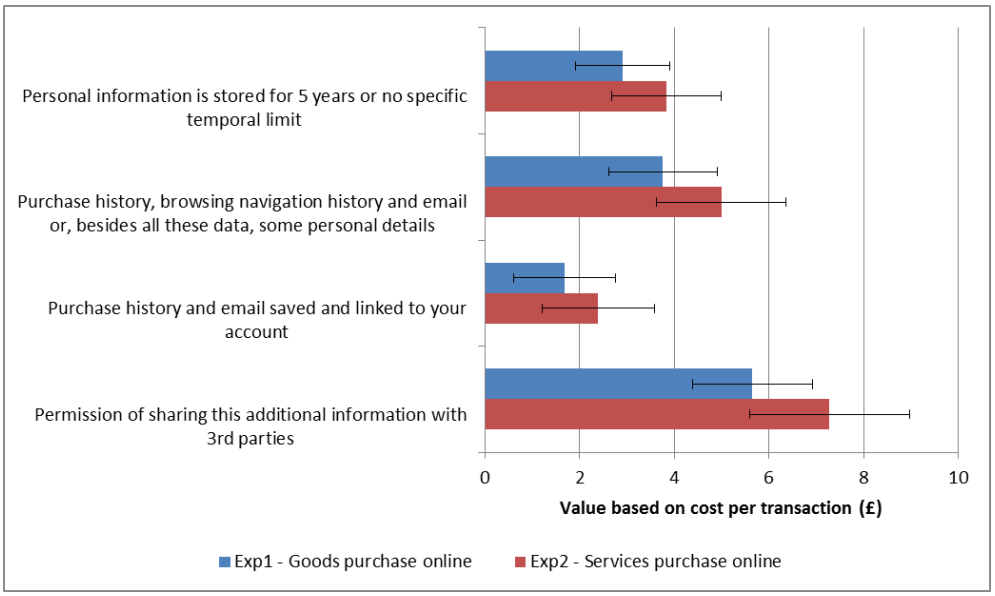
The SPDCE is consistent with utility maximisation and demand theory (Louviere et al., 2000). Once parameter estimates are estimated it is possible to estimate valuations about different attributes, such the willingness to pay[5] (WtP) or the willingness to accept[6] (WtA) for changes in the level of a given attribute (Hensher, et al., 2005). In the case of the WtP/WtA[7] regarding personal information, this can be calculated as being equal to:

[5] Willingness to pay is the maximum amount of money an individual would pay in exchange for getting the good or service object of study.
[6] Willingness to accept is the minimum amount of money an individual would receive in exchange for giving up an endowed object.
[7] In spite of neoclassical economic theory postulating that both measures are identical, there is empirical evidence that shows divergence between WtA and WtP values. In the experiments presented in the paper, there is a composite of both figures as respondents were asked both to pay and to receive discounts. Values obtained are expected to be closer to the value of WtA as this value is usually found to be much higher than WTP. There have been some pieces of research which have tried to find out the sources of this

$$WtP = -\beta_{cost}^{-1} \ln\left\{\frac{\sum_i \exp\left(V_i^1\right)}{\sum_i \exp\left(V_i^0\right)}\right\} \quad [5]$$

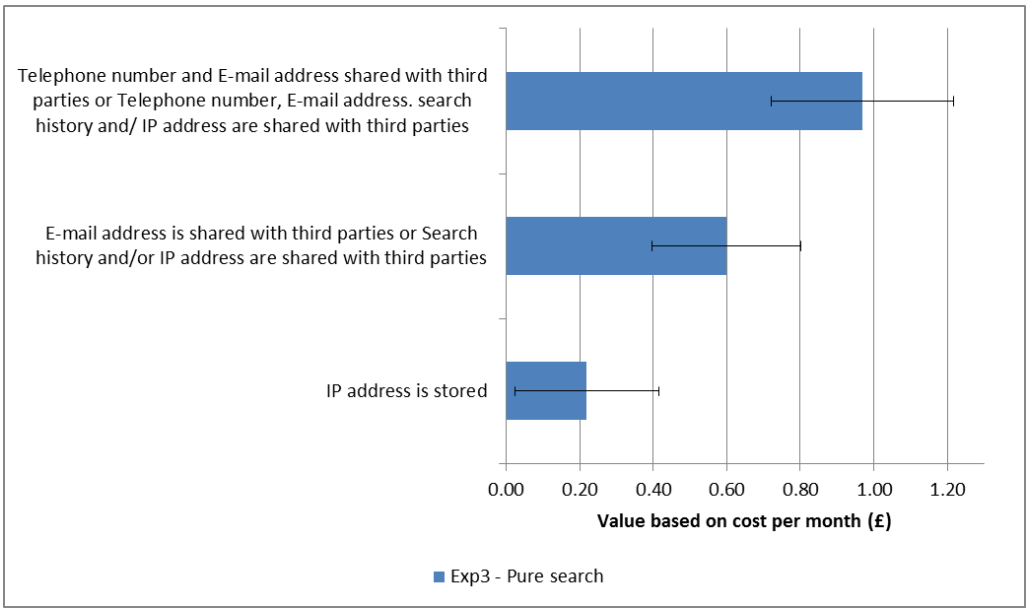
where V_i^0 represents the marginal utility of the base level (e.g. additional information saved and linked to your account: Only email) and V_i^1 represents the marginal utility of another level of the same attribute (e.g. additional information saved and linked to your account: Purchase history and email). β_{cost} is the coefficient of the cost per transaction in Experiments 1 and 2 and the monthly charge for using the search engine in Experiment 3, noted as β_{cost}, gives the marginal utility of price.

Figure 3.3. Valuation of personal information when purchasing goods and services and 95% confidence intervals for statistically significant parameter ratios



disparity. However, so far there is no consensus among researchers regarding the reasons for this gap. A complete review of WTP/WTA studies can be found in Horowitz & McConnell (2002).

Figure 3.4. Valuation of personal information in pure search experiment and 95% confidence intervals for statistically significant parameter ratios



In a simple linear relationship, each attribute in the utility expression and price are associated with one coefficient each. In that case, equation [5] can be simplified for any individual to the ratio of two utility parameters and provide an estimate of WtP/WtA:

$$WtP = -1\left(\frac{\beta_{purchasehistory\&\,email}}{\beta_{price}}\right) \qquad [6]$$

The results of the above computations are presented in figures 3.3. and 3.4. On average, respondents placed statistically-significant valuations of their personal information including storage of their information for more than five years when purchasing good and services at £2.91 and £3.84 per transaction, respectively. Storage of purchase

history for goods and services was valued on average between £1.68 (purchase history and email for product purchase) and £4.99 (purchase and browsing history, email and personal details for service purchase). The highest valuations, £5.65 for product purchase and £7.28 for service purchase, were placed on sharing of personal data with third parties (figure 3.3).

Concerning, the choice of search engine for conducting pure search, respondents valued their IP address at 22p per month, storage of their search history at 21p per month and the linkage between their search history with their geographical location (IP address) and email at 19p month. The highest valuations were for sharing the above information with third parties and ranged between 60p and 97p.

7. Discussion

This paper proposed the application of a widely used approach, known as stated preference discrete choice experiments, to estimate the value of personal information in real-life contexts and situations. The aim of this proposition of to move away for opinion-poll type of questions, which can only offer abstract and frequently vague evidence concernings citizens' importance and valuation of their personal information. In this paper, we developed three discrete choice experiments describing hypothetical situations in which respondents considered varying aspects of their personal information (e.g. storage, sharing with third parties)

when purchasing a product, service or conducting pure search online. More than 90% of the participants were able to make comparisons across all three experiments. This finding indicated that the choice tasks undertaken were congitively accessible for the majority of respondents. In particular, in each experiment a number of scenarios were presented to respondents with specific attributes and including a monetary cost attribute for the estimation of individuals' WTP. The values of prices have been kept low to be credible and realistic to minimise the possibility for strategic behaviour. Users could choose among various alternatives and a "choose neither". With the inclusion of this alternative, is it possible to compare more realistically the behaviour of users, confronting the conventional and online worlds and acknowledging that just online options do not explain completely all consumer choices in a real-life situation.

Findings appear to confirm the privacy paradox[8]. On one hand, participants are worried about the use of their data and they certainly value their privacy (see below). On the other, there was little interest by respondents to pay in order to introduce control over their personal data. This finding offers an indication that simple privacy enhanced technogies paid on behalf of consumers might not constitude a viable option, and that a better approach to reconcile user perceptions on the usage of personal information in online transactions is still needed. Admittedly, privacy-enhancing technologies could be welfare enhancing for

[8] Privacy paradox: discrepancy between privacy concerns and actual privacy settings (Barnes, 2006).

consumers and society as a whole, although a complete model including this analysis is still missing. The findings in the survey amount to the possibility that privacy-enhancing technologies may lead to non-zero sum market outcomes as it has also started to be explicitly discussed in economic research (Acquisti, 2008). Another avenue for further research from these results would be to educate consumers in how to make intelligent use of the tools within their reach. Having said that, not having options on privacy-enhancement is very different, particularly from a policy perspective, than choosing –judiciously or not[9]– not to exercise them.

The extend of sharing of personal information with third parties was seen the most important aspect when choosing online retailers and search engines. Therefore it is questionnable whether the freemium business models based on this appoach would be viable. It also signals that consumers do differentiate between the bounded use of personal information that takes place within the providers business objectives and the largely unkown usage by third parties. This is an area of current intense policy and commercial debate and these results could contribute to effectively explain that this distintion about usages matters signficantly to consumers. These results follow Nissenbaum (2010), who states that users' concerns originate not from the potential lack of restrictions over the flow of personal information, but from the distress about maintaining

[9] An experiment carried out by Acquisti & Grossklags (2005) provided evidence on the difference between individual decision making and rational behaviour. The authors concluded that in some Internet scenarios most individuals are not able to make rational decisions because of lack of information, the so called "bounded rationality" effect.

the context integrity of personal information while it flows across systems and services.

Finally, an unspecified duration of data storage was received as badly as the data storage beyond five years for online retailers and worst than shorter durations. In case of pure search however, the duration of data storage did not matter to users possibly because it can be thought to include less personal information (details of person's address, payment card information etc.). This is an intriguing finding, which might have further implications for policy and with further evidence might reflect a contradictory insight in the right to be forgotten in this context.

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